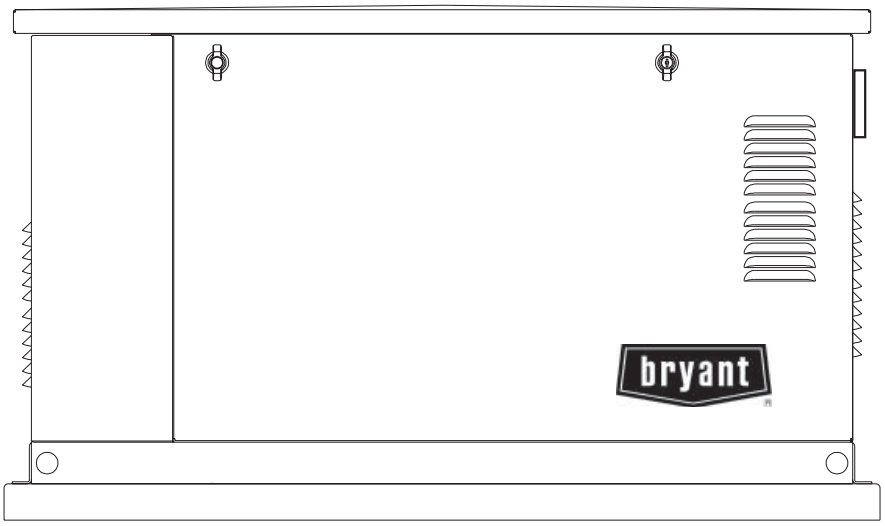
Installation and Owner's Manual

Air-cooled Automatic Standby Generators
Model: ASPAX1BBA015
(13 kW NG, 15 kW LP)



This manual should remain with the unit.

Not intended for use as Primary Power in place of utility or in life-support applications.

DANGER

DEADLY EXHAUST FUMES. OUTDOOR INSTALLATION ONLY!

INTRODUCTION

Thank you for purchasing this model of the Bryant product line. This model is a compact, high performance, air-cooled, engine-driven generator designed to automatically supply electrical power to operate critical loads during a utility power failure.

This unit is factory installed in an all-weather, metal enclosure that is intended exclusively for outdoor installation. This generator will operate using either vapor withdrawn liquid propane (LP) or natural gas (NG).

This unit meets the 1998 and later California emissions regulations. To ensure that the engine continues to meet these regulations, refer to the following information and instructions in this owner's manual.

◆ READ THIS MANUAL THOROUGHLY

If any portion of this manual is not understood, contact the nearest dealer for starting, operating and servicing procedures.

Throughout this publication, and on tags and decals affixed to the generator, DANGER, WARNING, CAUTION and NOTE blocks are used to alert personnel to special instructions about a particular operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. Their definitions are as follows:

⚠ DANGER ⚠

After this heading, read instructions that, if not strictly complied with, will result in serious personal injury, including death, in addition to severe property damage.

⚠ WARNING ⚠

After this heading, read instructions that, if not strictly complied with, may result in serious personal injury or property damage.

⚠ CAUTION ⚠

After this heading, read instructions that, if not strictly complied with, could result in damage to equipment and/or property.

NOTE:

After this heading, read explanatory statements that require special emphasis.

These safety warnings cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the service are essential to preventing accidents.

Four commonly used safety symbols accompany the DANGER, WARNING and CAUTION blocks. The type of information each indicates follows:

⚠ **This symbol points out important safety information that, if not followed, could endanger personal safety and/or property of others.**

⚠ **This symbol points out potential explosion hazard.**

⚠ **This symbol points out potential fire hazard.**

⚠ **This symbol points out potential electrical shock hazard.**

The operator is responsible for proper and safe use of the equipment. The manufacturer strongly recommends that the operator read this *Owner's Manual* and thoroughly understand all instructions before using this equipment. The manufacturer also strongly recommends instructing other users to properly start and operate the unit. This prepares them if they need to operate the equipment in an emergency.

◆ CONTENTS

This manual contains pertinent owner's information, including warranty, electrical diagrams, exploded views and lists of repair parts, for model:

- Model ASPAX1BBA015 – 13 kW NG, 15 kW LP, V-twin GT-990 Engine

◆ OPERATION AND MAINTENANCE

It is the operator's responsibility to perform all safety checks, to make sure that all maintenance for safe operation is performed promptly, and to have the equipment checked periodically by a dealer. Normal maintenance service and replacement of parts are the responsibility of the owner/operator and, as such, are not considered defects in materials or workmanship within the terms of the warranty. Individual operating habits and usage contribute to the need for maintenance service.

Proper maintenance and care of the generator ensures a minimum number of problems and keep operating expenses at a minimum. See a dealer for service aids and accessories.

◆ HOW TO OBTAIN SERVICE

When the generator requires servicing or repairs, simply contact a dealer for assistance. Service technicians are factory-trained and are capable of handling all service needs.

When contacting a dealer about parts and service, always supply the complete model number and serial number of the unit as given on its data decal, which is located on the generator.

The Bryant Dealer is:

Dealer Name _____

Address _____

City _____ State _____ Zip _____

Model No._____ Serial No._____

Introduction .....Inside Front Cover
Read This Manual Thoroughly ..... IFC
Contents ..... IFC
Operation and Maintenance ..... IFC
How to Obtain Service ..... IFC
Safety Rules 2
Standards Index 3
Section 1 – General Information 4
1.1 Unpacking/Inspection 4
1.2 Location 4
1.3 Protection Systems 4
1.4 System Set LED 4
1.5 The Generator 5
1.6 Specifications 6
1.6.1 Generator 6
1.6.2 Engine 6
1.7 Fuel Requirements and Recommendations ... 6
1.8 Fuel Consumption 6
1.9 Reconfiguring the Fuel System 7
1.9.1 15 kW, 990cc Engines 7
1.10 Location 7
1.10.1 Generator 7
1.10.2 Transfer Switch 8
1.11 Battery Installation 8
1.12 The Battery 8
Section 2 – Post Installation Start-up and Adjustments 9
2.1 Before Initial Start-up 9
2.2 Check Transfer Switch Operation 9
2.3 Electrical Checks 9
2.4 Generator Tests Under Load 10
2.5 Checking Automatic Operation 10
2.6 Adjusting the Regulator (Natural Gas Only) .. 11
2.7 Engine Governor Adjustment 12
2.7.1 15 kW Units 12
2.8 Voltage Regulator Adjustment 12
Section 3 – Operation 12
3.1 Break-in Procedure 12
3.2 Using the Auto/Off/Manual Switch 13
3.2.1 "Auto" Position 13
3.2.2 "Off" Position 13
3.2.3 "Manual" Position 13
3.3 Automatic Transfer Operation 13
3.3.1 12 VDC Accessory Outlet 13
3.3.2 120 VAC GFCI Outlet 14
3.4 Sequence of Automatic Operation 14
3.5 Manual Transfer Operation 14
3.5.1 Transfer to Generator Power Source 14
3.5.2 Transfer Back to Utility Power Source 15
3.6 Setting the Exercise Timer 15
3.7 Protection Systems 15
3.7.1 Low Oil Pressure Switch 15
3.7.2 High Temperature Switch 15
3.7.3 Overcrank 16
3.7.4 Overspeed 16
Section 4 – Maintenance 16
4.1 Fuses 16
4.2 Checking the Engine Oil Level 16
4.3 Changing the Engine Oil 16
4.3.1 Engine Oil Recommendations 16
4.3.2 Oil Change Procedure 17
4.4 Changing the Oil Filter 17
4.5 Changing the Engine Air Cleaner 17
4.5.1 15 kW Generators 17
4.6 Spark Plug(s) 17
4.7 Battery Maintenance 18
4.8 Adjusting Valve Clearance 18
4.9 Cooling System 19
4.10 Attention After Submersion 19
4.11 Corrosion Protection 19
4.11.1 Additional Corrosion Protection 19
4.12 Out of Service Procedure 20
4.12.1 Removal From Service 20
4.12.2 Return to Service 20
4.13 Service Schedule 21
Section 5 – Troubleshooting 22
5.1 Troubleshooting Guide 22
Section 6 – Mounting Dimensions 23
Section 7 – Electrical Data 24
Section 8 – Exploded Views and Parts Lists 28
Section 9 – Warranty 40

SAVE THESE INSTRUCTIONS – The manufacturer suggests that these rules for safe operation be copied and posted in potential hazard areas. Safety should be stressed to all operators, potential operators, service and repair technicians for this equipment.

WARNING:

The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

WARNING:

This product contains or emits chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Study these SAFETY RULES carefully before installing,operating or servicing this equipment. Become familiar with this Owner's Manual and with the unit. The generator can operate safely, efficiently and reliably only if it is properly installed, operated and maintained.

The manufacturer cannot anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all-inclusive. Any personal injury or property damage resulting from the use of a procedure, work method or operating technique not specifically recommended by the manufacturer, shall be the sole responsibility of the operator. Operators who deviate from manufacturer recommended safety procedures and operating techniques, or fail to take the necessary precautions, do so at their own risk.

DANGER

Despite the safe design of this generator, operating this equipment imprudently, neglecting its maintenance or being careless can cause possible injury or death. Permit only responsible and capable persons to operate or maintain this equipment.

Potentially lethal voltages are generated by these machines. Ensure all steps are taken to render the machine safe before attempting to work on the generator.

Parts of the generator are rotating and/or hot during operation. Exercise care near running generators.

GENERAL HAZARDS

- For safety reasons, the manufacturer recommends that the installation, initial start-up and maintenance of this equipment is carried out by a dealer.
- The engine exhaust fumes contain carbon monoxide, which can be DEADLY. This dangerous gas, if breathed in sufficient concentrations, can cause unconsciousness or even death. This exhaust system must be installed properly, in strict compliance with applicable codes and standards. Following installation, do nothing that might render the system unsafe or in noncompliance with such codes and standards.
- Keep hands, feet, clothing, etc., away from drive belts, fans, and other moving or hot parts. Never remove any drive belt or fan guard while the unit is operating.
- Adequate, unobstructed flow of cooling and ventilating air is critical to correct generator operation. Do not alter the installation or permit even partial blockage of ventilation provisions, as this can seriously affect safe operation of the generator. The generator MUST be installed outdoors.
- When working on this equipment, remain alert at all times. Never work on the equipment when physically or mentally fatigued.
- Inspect the generator regularly, and contact the nearest dealer for parts needing repair or replacement.
- Before performing any maintenance on the generator, disconnect its battery cables to prevent accidental start up. Disconnect the cable from the battery post indicated by a NEGATIVE, NEG or (–) first. Reconnect that cable last.
- Never use the generator or any of its parts as a step. Stepping on the unit can stress and break parts, and may result in dangerous operating conditions from leaking exhaust gases, fuel leakage, oil leakage, etc.

ELECTRICAL HAZARDS

- All generators covered by this manual produce dangerous electrical voltages and can cause fatal electrical shock. Utility power delivers extremely high and dangerous voltages to the transfer switch as does the standby generator when it is in operation. Avoid contact with bare wires, terminals, connections, etc., while the unit is running. Ensure all appropriate covers, guards and barriers are in place before operating the generator. If work must

be done around an operating unit, stand on an insulated, dry surface to reduce shock hazard.

- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. DANGEROUS ELECTRICAL SHOCK MAY RESULT.
- The National Electrical Code (NEC) requires the frame and external electrically conductive parts of the generator to be connected to an approved earth ground. Local electrical codes also may require proper grounding of the generator electrical system.
- After installing this home standby electrical system, the generator may crank and start at any time without warning. When this occurs, load circuits are transferred to the STANDBY (GENERATOR) power source. To prevent possible injury if such a start and transfer occur, always set the generator's AUTO/OFF/MANUAL switch to its OFF position before working on equipment and remove the 7.5A and 15A fuses from the generator control panel.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. AVOID DIRECT CONTACT WITH THE VICTIM. Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and get immediate medical help.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock, or may get caught in moving components causing injury.

FIRE HAZARDS

- For fire safety, the generator must be installed and maintained properly. Installation always must comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state and national electrical and building codes. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established. Also, ensure that the generator is installed in accordance with the manufacturer's instructions and recommendations. Following proper installation, do nothing that might alter a safe installation and render the unit in noncompliance with the aforementioned codes, standards, laws and regulations.
- Keep a fire extinguisher near the generator at all times. Extinguishers rated "ABC" by the National Fire Protection Association are appropriate for use on the standby electric system. Keep the extinguisher properly charged and be familiar with its use. Consult the local fire department with any questions pertaining to fire extinguishers.

EXPLOSION HAZARDS

- Do not smoke around the generator. Wipe up any fuel or oil spills immediately. Ensure that no combustible materials are left in the generator compartment, or on or near the generator, as FIRE or EXPLOSION may result. Keep the area surrounding the generator clean and free from debris.
- Gaseous fluids such as natural gas and liquid propane (LP) gas are extremely EXPLOSIVE. Install the fuel supply system according to applicable fuel-gas codes. Before placing the home standby electric system into service, fuel system lines must be properly purged and leak tested according to applicable code. After installation, inspect the fuel system periodically for leaks. No leakage is permitted.

◆ STANDARDS INDEX

In the absence of pertinent standards, codes, regulations and laws, the published information listed below may be used as installation guide for this equipment.

1. NFPA No. 37, STATIONARY COMBUSTION ENGINES AND GAS TURBINES, available from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.
2. NFPA No. 76A, ESSENTIAL ELECTRICAL SYSTEMS FOR HEALTH CARE FACILITIES, available same as Item 1.
3. NFPA No. 54, NATIONAL FUEL GAS CODE, available same as Item 1.
4. NFPA No. 58, AMERICAN NATIONAL STANDARD FOR STORAGE AND HANDLING OF LIQUEFIED PETROLEUM GAS, available same as Item 1.
5. NFPA No. 70, NFPA HANDBOOK OF NATIONAL ELECTRIC CODE, available same as Item 1.
6. Article X, NATIONAL BUILDING CODE, available from the American Insurance Association, 85 John Street, New York, N.Y. 10038.
7. AGRICULTURAL WIRING HANDBOOK, available from the Food and Energy Council, 909 University Avenue, Columbia, MO 65201.
8. ASAE EP-3634, INSTALLATION AND MAINTENANCE OF FARM STANDBY ELECTRICAL SYSTEMS, available from the American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085.
9. NFPA No. 30, FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE, available same as Item 1.

DANGER

Only qualified electricians or contractors should attempt such installations, which must comply strictly with applicable codes, standards and regulations.

1.1 UNPACKING/INSPECTION

After unpacking, carefully inspect the contents for damage.

- This standby generator set has been factory supplied with a weather protective enclosure that is intended for **outdoor installation only**.

WARNING

If this generator is used to power electrical load circuits normally powered by a utility power source, it is required by code to install a transfer switch. The transfer switch must effectively isolate the electrical system from the utility distribution system when the generator is operating (NEC 700, 701 and 702). Failure to isolate an electrical system by such means will result in damage to the generator and also may result in injury or death to utility power workers due to backfeed of electrical energy.

If any loss or damage is noted at time of delivery, have the person(s) making the delivery note all damage on the freight bill or affix his or her signature under the consignor's memo of loss or damage.

If a loss or damage is noted after delivery, separate the damaged materials and contact the carrier for claim procedures.

"Concealed damage" is understood to mean damage to the contents of a package that is not in evidence at the time of delivery, but is discovered later.

1.2 LOCATION

To lift the generator, insert pipe having sufficient strength and diameter through the lifting holes which are located near the unit's base (see Figure 1.1). The unit may also be lifted by using a hook and hoist method provided a spreader bar is used to ensure the lifting lines clear the roof panel.

DANGER

When lifting or hoisting equipment is used, be careful not to contact overhead power lines.

The generator's weight of more than 300 pounds requires proper tools, equipment and qualified personnel to be used in all phases of handling and unpacking.

1.3 PROTECTION SYSTEMS

Unlike an automobile engine, the generator may have to run for long periods of time with no operator present to monitor engine conditions. For that reason, the engine is equipped with the following systems that protect it against potentially damaging conditions:

1. Low Oil Pressure Sensor
2. High Temperature Sensor
3. Overcrank
4. Overspeed

There are LED readouts on the control panel to indicate that one of these faults has occurred. There is also a "System Set" LED that is described below.

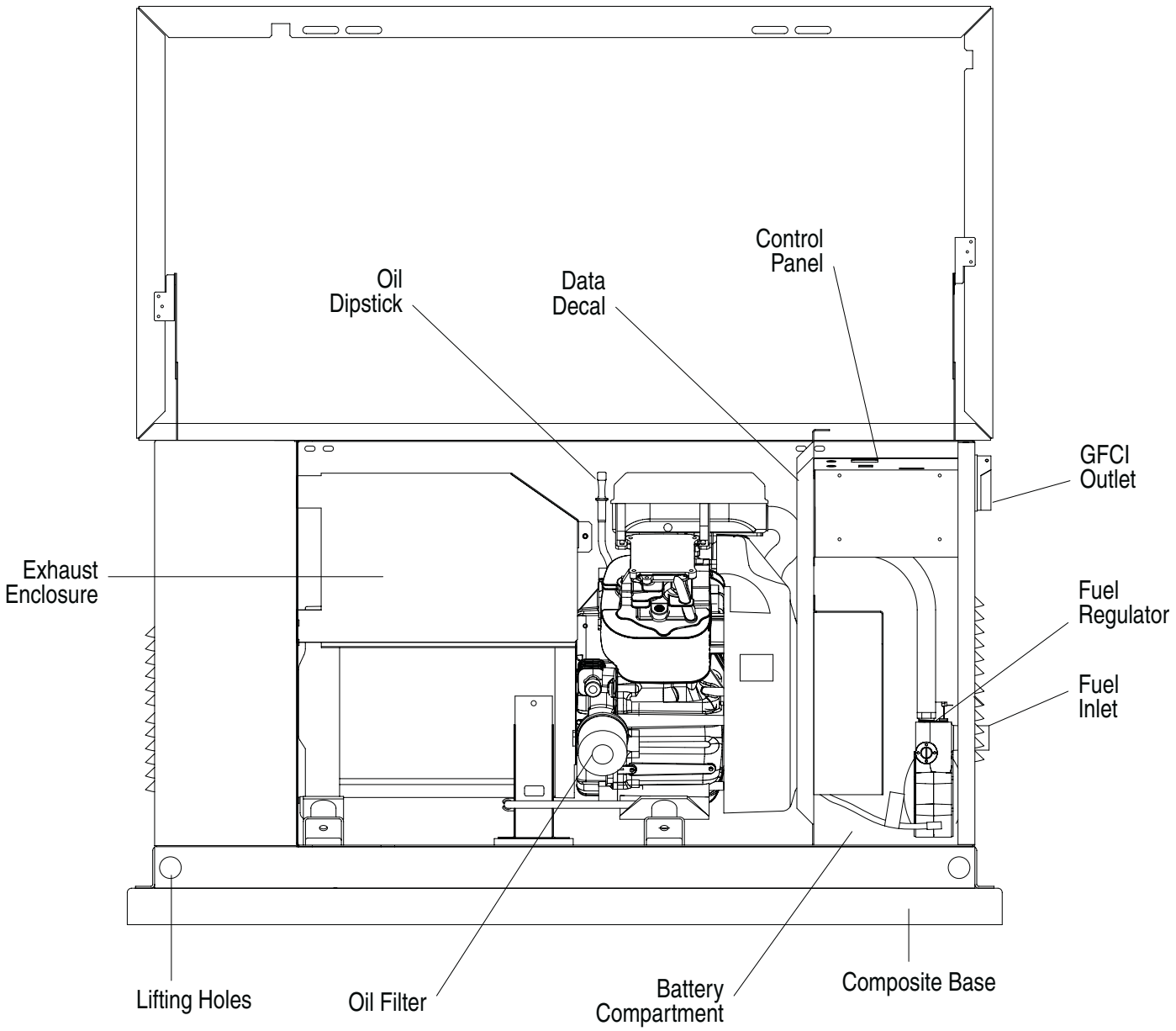
1.4 SYSTEM SET LED

The "System Set" LED is lit when all of the following conditions are true:

1. The AUTO/OFF/MANUAL switch is set to the AUTO position.
2. The utility voltage being supplied to the unit is being sensed by the Control PCB. If the utility sense voltage is not connected to the unit or if it is below 168 volts AC, then the system set light will flash rapidly. This indicates that if the AUTO/OFF/MANUAL switch is placed in the Auto position , the generator will start.
3. The "Not In Auto" dip switch is set to the OFF position on the control board.
4. No alarms are present, for example, low oil pressure, high temperature, etc.

1.5 THE GENERATOR

Figure 1.1 – 15 kW, V-twin GT-990



1.6 SPECIFICATIONS

◆ 1.6.1 GENERATOR

Rated Max. Cont. Power Capacity (Watts*) ..... 13,000 NG/ 15,000 LP†
Rated Voltage..... 120/240
Rated Max. Continuous Load Current (Amps)
120 Volts + ...108.3 NG/125.0 LP
240 Volts.....54.2 NG/62.5 LP
Main Line Circuit Breaker.....65 Amp
Phase 1
Number of Rotor Poles..... 2
Rated AC Frequency.....60 Hz
Power Factor 1
Recommended Air Filter .....Part # 0C8127
Battery Requirement at
-17.8° C (0° F) .....Group 26/26R 12 Volts and 525 Cold-cranking Amperes Minimum
Weight ..... 487 Pounds
Output Sound Level @ 23 ft (7m)
at full load ..... 71.5 db (A)
Normal Operating Range.....-20°F (-28.8°C) to 104°F (40°C)

* Maximum wattage and current are subject to and limited by such factors as fuel Btu content, ambient temperature, altitude, engine power and condition, etc. Maximum power decreases about 3.5 percent for each 1,000 feet above sea level; and also will decrease about 1 percent for each 6° C (10° F) above 16° C (60° F).

\+ Total current in two separate circuits. Current in each circuit must not exceed the value stated for 240V.

◆ 1.6.2 ENGINE

Type of Engine GT-990
Number of Cylinders..... 2
Rated Horsepower.....30 @ 3,600 rpm
Displacement 992cc
Cylinder Block .....Aluminum w/Cast Iron Sleeve
Valve Arrangement .....Overhead Valves
Ignition System .....Solid-state w/Magneto
Recommended Spark Plug..... RC12YC
Spark Plug Gap.....0.508 mm (0.020 inch)
Compression Ratio..... 9.5:1
Starter..... 12Vdc
Oil Capacity Including Filter..... Approx. 1.7 Qts
Recommended Oil Filter ..... Part # 070185
Recommended Air Filter .....Part # 0C8127
Operating RPM..... 3,600

1.7 FUEL REQUIREMENTS AND RECOMMENDATIONS

With LP gas, use only the vapor withdrawal system. This type of system uses the vapors formed above the liquid fuel in the storage tank.

The engine has been fitted with a fuel carburetion system that meets the specifications of the 1997 California Air Resources Board for tamper-proof dual fuel systems. The unit will run on natural gas or LP gas, but it has been factory set to run on natural gas. Should the primary fuel need to be changed to LP gas, the fuel system needs to be reconfigured. See instructions in the "Reconfiguring the Fuel System" section.

Recommended fuels should have a Btu content of at least 1,000 Btus per cubic foot for natural gas; or at least 2,520 Btus per cubic foot for LP gas. Ask the fuel supplier for the Btu content of the fuel.

Required fuel pressure for **natural gas is 5 inches to 7 inches water column (0.18 to 0.25 psi); and for liquid propane, 11 inches to 14 inches of water column (0.4 to 0.5 psi).**

NOTE:

Any piping used to connect the generator to the fuel supply should be of adequate size to ensure the fuel pressure NEVER drops below 4 inches water column for natural gas or 10 inches water column for liquid propane for all load ranges.

1.8 FUEL CONSUMPTION

Model #	Nat. Gas (*)		LP Vapor (**)	
	1/2 Load	Full Load	1/2 Load	Full Load
05207	156	220	1.58/58	2.40/88

* Natural gas is in cubic feet per hour.
** LP is in gallons per hour/cubic feet per hour.
*** Values given are approximate.

⚠ DANGER ⚠

Gaseous fuels such as natural gas and liquid propane (LP) gas are highly explosive. Even the slightest spark can ignite such fuels and cause an explosion. No leakage of fuel is permitted. Natural gas, which is lighter than air, tends to collect in high areas. LP gas is heavier than air and tends to settle in low areas.

1.9 RECONFIGURING THE FUEL SYSTEM

◆ 1.9.1 15KW, 990CC ENGINES

To reconfigure the fuel system from NG to LP, follow these steps:

NOTE:

The primary regulator for the propane supply is NOT INCLUDED with the generator. A fuel pressure of 11 to 14 inches of water column (0.4 to 0.5 psi) to the fuel inlet of the generator MUST BE SUPPLIED.

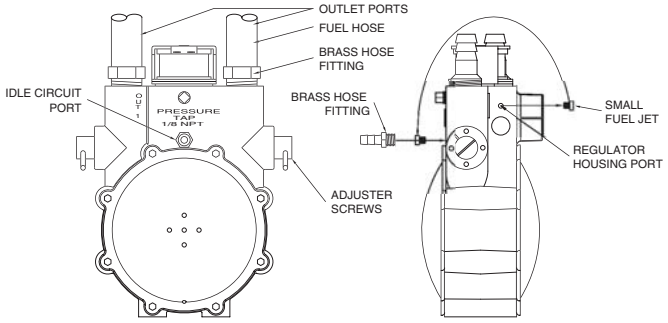
1. Turn off the gas supply. (if connected)
2. Open the roof and remove the door.
3. Remove the battery. (if installed)
4. Remove the engine air in baffle located on the left-hand side of the battery compartment. Two M6 screws are located on top of the baffle and two M6 screws are located on the inside of the baffle towards the back.
5. Remove the small hose clamp and hose from the fuel regulator. It may be necessary to pry the hose off of the brass fitting using a screwdriver to gently lift up the hose edge.
6. Remove the small brass hose fitting from the regulator casting.
7. Place the small fuel jet, thread side first, into the threaded hole originally occupied by the brass hose fitting (Figure 1.2).
8. Using a short No. 2 Phillips screw driver, thread the small fuel jet into the regulator casting. Do not over tighten.
9. Apply thread sealant to the threads of the hose fitting and replace it into the regulator body.
10. Re-attach the small hose and hose clamp and tighten as necessary.
11. Replace the engine air in baffle using the four M6 screws.
12. Identify both brass adjustment screws on the regulator.

NOTE:

One adjustment screw can be accessed from the front of the unit and the second can be accessed from the back of the unit enclosure by removing the plastic hole plug. The screw can be turned with a long flat blade screwdriver.

13. To adjust the system to run on LP fuel, turn BOTH adjuster screws 1/2 TURN CLOCKWISE. The system should now be set for maximum power and best performance. **DO NOT, UNDER ANY CIRCUMSTANCES, REMOVE THE SET PINS FROM THE REGULATOR HOUSING. THIS WILL VOID THE WARRANTY.**

Figure 1.2 - Demand Regulator



14. It may be necessary to make minor adjustments to the preset adjustment screw settings to achieve maximum power, particularly at higher altitudes. If experiencing problems with the unit producing maximum power, follow the procedure in Section 2.6 (Adjusting the Fuel Regulator).

1.10 LOCATION

◆ 1.10.1 GENERATOR

Install the generator set, in its protective enclosure, outdoors, where adequate cooling and ventilating air is always available. Consider these factors:

- Install the unit where air inlet and outlet openings will not become obstructed by leaves, grass, snow, etc. If prevailing winds will cause blowing or drifting, consider using a windbreak to protect the unit.
- Install the generator on high ground where water levels will not rise and endanger it.
- Allow sufficient room on all sides of the generator for maintenance and servicing. A good rule is to allow three feet of space on all sides.
- Where strong prevailing winds blow from one direction, face the generator air inlet openings to the prevailing winds.
- Install the generator as close as possible to the fuel supply, to reduce the length of piping.
- Install the generator as close as possible to the transfer switch. HOWEVER, REMEMBER THAT LAWS OR CODES MAY REGULATE THE DISTANCE.
- The genset must be installed on a level surface. The base frame must be level within two (2) inches all around.

◆ 1.10.2 TRANSFER SWITCH

1.10.2.1 15 kW Units

Transfer switches for use with this generator are sold separately and can be purchased from dealers.

- Install any transfer switch in accordance with the instructions supplied with the transfer switch.
- Failure to utilize a the manufacturer's transfer switch with this generator will void the warranty.

1.11 BATTERY INSTALLATION

Fill the battery with the proper electrolyte fluid if necessary and have the battery fully charged before installing it.

Before installing and connecting the battery, complete the following steps:

1. Set the generator's AUTO/OFF/MANUAL switch to OFF.
2. Turn off utility power supply to the transfer switch.
3. Remove the 7.5 amp and 15 amp fuses from the generator control panel.

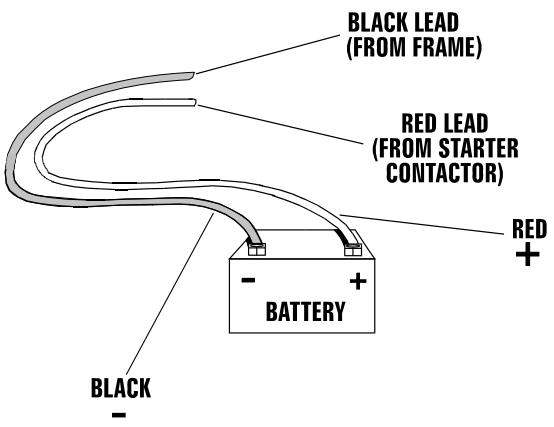
Battery cables were factory connected at the generator (Figure 1.3). Connect cables to battery posts as follows:

4. Connect the red battery cable (from starter contactor) to the battery post indicated by a positive, POS or (+).
5. Connect the black battery cable (from frame ground) to the battery post indicated by a negative, NEG or (—).
6. Replace the 7.5 amp and 15 amp fuses in the generator control panel.

NOTE:

Damage will result if battery connections are made in reverse.

Figure 1.3 – Battery Cable Connections



NOTE:

The generator is equipped with a battery trickle charger that is active when the unit is set up for automatic operation. With the battery installed and utility power source voltage available to the transfer switch, the battery receives a trickle charge while the engine is not running, to prevent self-discharge. The trickle charger is designed to help extend the life of the battery by maintaining the battery when the unit is not running. The trickle charge feature cannot be used to recharge a discharged battery.

1.12 THE BATTERY

Servicing of the battery is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

When replacing the battery, use the following type of battery: Group 26/26R 12-volt battery with a rating of 525 cold-cranking amps minimum for 15 kW at -17.8° C (0° F) minimum. When using a maintenance-free battery, it is not necessary to check the specific gravity or electrolyte level. Have these procedures performed at the intervals specified in the "Service Schedule." A negative ground system is used. Battery connections are shown on the wiring diagrams. Make sure the battery is correctly connected and terminals are tight. Observe battery polarity when connecting the battery to the generator set.

⚠ DANGER ⚠

Do not dispose of the battery in a fire. The battery is capable of exploding.

A battery presents a risk of electrical shock and high short circuit current. The following precautions are to be observed when working on batteries:

- **Remove the 7.5A and 15A fuses from the generator control panel;**
- **Remove watches, rings or other metal objects;**
- **Use tools with insulated handles;**
- **Wear rubber gloves and boots;**
- **Do not lay tools or metal parts on top of the battery; and**
- **Disconnect charging source prior to connecting or disconnecting battery terminals.**

⚠ WARNING ⚠

Do not open or mutilate the battery. Released electrolyte has been known to be harmful to the skin and eyes, and to be toxic.

The electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive.

The following procedures are to be observed:

- **Wear full eye protection and protective clothing;**
- **Where electrolyte contacts the skin, wash it off immediately with water;**
- **Where electrolyte contacts the eyes, immediately flush thoroughly with water and seek medical attention; and**
- **Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of 1 pound (500 grams) bicarbonate of soda to 1 gallon (4 liters) or water. The bicarbonate of soda solution is to be added until the evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.**

Lead-acid batteries present a risk of fire because they generate hydrogen gas. The following procedures are to be followed:

- **DO NOT SMOKE when near the battery;**
- **DO NOT cause flame or spark in battery area; and**
- **Discharge static electricity from body before touching the battery by first touching a grounded metal surface.**

Be sure the AUTO/OFF/MANUAL switch is set to the OFF position before connecting the battery cables. If the switch is set to AUTO or MANUAL, the generator can crank and start as soon as the battery cables are connected.

Be sure the utility power supply is turned off, or sparking may occur at the battery posts as the cables are attached and cause an explosion.

2.1 BEFORE INITIAL START-UP

Before starting, complete the following:

1. Set the generator's main circuit breaker to its OFF (or open) position.
2. Set the generator's AUTO/OFF/MANUAL switch to the OFF position.
3. Turn OFF the utility power supply to the transfer switch using the means provided (such as the utility main line circuit breaker).
4. Check the engine crankcase oil level and, if necessary, fill to the dipstick FULL mark with the recommended oil. Do not fill above the FULL mark.
5. Check the fuel supply. Gaseous fuel lines must have been properly purged and leak tested in accordance with applicable fuel-gas codes. All fuel shutoff valves in the fuel supply lines must be open.

CAUTION

Never operate the engine with the oil level below the "Add" mark on the dipstick. Doing this could damage the engine.

2.2 CHECK TRANSFER SWITCH OPERATION

Refer to Section 3.5, of the owner's manual for manual operation procedures.

DANGER

Do not attempt manual transfer switch operation until all power voltage supplies to the transfer switch have been positively turned off. Failure to turn off all power voltage supplies will result in extremely hazardous and possibly fatal electrical shock.

2.3 ELECTRICAL CHECKS

Complete electrical checks as follows:

1. Set the generator's main circuit breaker to its OFF (or open) position.
2. Set the generator's AUTO/OFF/MANUAL switch to the OFF position.
3. Turn OFF the utility power supply to the transfer switch using the means provided (such as the utility main line circuit breaker).
4. Turn on the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).

DANGER

The transfer switch is now electrically "hot." Contact with "hot" parts will result in extremely hazardous and possibly fatal electrical shock. Proceed with caution.

5. Use an accurate AC voltmeter to check utility power source voltage across terminals N1 and N2. Nominal line-to-line voltage should be 240 volts AC.
6. Check utility power source voltage across terminals N1 and the transfer switch neutral lug; then across terminal N2 and neutral. Nominal line-to-neutral voltage should be 120 volts AC.
7. When certain that utility supply voltage is compatible with transfer switch and load circuit ratings, turn OFF the utility power supply to the transfer switch.
8. Set the generator's main circuit breaker to its OFF (or open) position. Initial tests will be conducted at no-load condition.
9. On the generator panel, set the AUTO/OFF/MANUAL switch to MANUAL. The engine should crank and start.
10. Let the engine warm up for about five minutes to allow internal temperatures to stabilize. Then, set the generator's main circuit breaker to its ON (or closed) position.

⚠ DANGER ⚠

⚠ Proceed with caution! Generator power voltage is now supplied to the transfer switch. Contact with live transfer switch parts will result in dangerous and possibly fatal electrical shock.

11. Connect an accurate AC voltmeter and a frequency meter across transfer switch terminal lugs E1 and E2. Voltage should be 242-252 volts; frequency should read about 61-63 Hertz.
12. Connect the AC voltmeter test leads across terminal lug E1 and neutral; then across E2 and neutral. In both cases, voltage reading should be 121-126 volts AC.
13. Set the generator's main circuit breaker to its OFF (or open) position. Let the engine run at no-load for a few minutes to stabilize internal engine generator temperatures.
14. Set the generator's AUTO/OFF/MANUAL switch to OFF. The engine should shut down.

NOTE:

It is important not to proceed until certain that generator AC voltage and frequency are correct and within the stated limits. Generally, if both AC frequency and voltage are high or low, the engine governor requires adjustment. If frequency is correct, but voltage is high or low, the generator's voltage regulator requires adjustment.

2.4 GENERATOR TESTS UNDER LOAD

To test the generator set with electrical loads applied, proceed as follows:

1. Set generator's main circuit breaker to its OFF (or open) position.
2. Set the generator's AUTO/OFF/MANUAL switch to OFF.
3. Turn OFF the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).

⚠ WARNING ⚠

⚠ Do not attempt manual transfer switch operation until all power voltage supplies to the transfer switch have been positively turned off. Failure to turn off all power voltage supplies will result in extremely hazardous and possibly fatal electrical shock.

4. Manually set the transfer switch to the STANDBY position, i.e., load terminals connected to the generator's E1/E2 terminals. The transfer switch operating lever should be down.
5. Set the generator's AUTO/OFF/MANUAL switch to MANUAL. The engine should crank and start immediately.
6. Let the engine stabilize and warm up for a few minutes.
7. Set the generator's main circuit breaker to its ON (or closed) position. Loads are now powered by the standby generator.
8. Turn ON electrical loads. Apply an electrical load equal to the full rated wattage/amperage capacity of the installed generator.
9. Connect an accurate AC voltmeter and a frequency meter across terminal lugs E1 and E2. Voltage should be greater than 230 volts; frequency should be greater than 58 Hertz.
10. Let the generator run at full rated load for 20-30 minutes. Listen for unusual noises, vibration or other indications of abnormal operation. Check for oil leaks, evidence of overheating, etc.
11. When testing under load is complete, turn OFF electrical loads.
12. Set the generator's main circuit breakers to their OFF (or open) positions.
13. Let the engine run at no-load for a few minutes.
14. Set the AUTO/OFF/MANUAL switch to OFF. The engine should shut down.

2.5 CHECKING AUTOMATIC OPERATION

To check the system for proper automatic operation, proceed as follows:

1. Set the generator's main circuit breaker to it's OFF (or open) position.
2. Check that the AUTO/OFF/MANUAL switch is set to OFF.
3. Turn OFF the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).
4. Manually set the transfer switch to the UTILITY position, i.e., load terminals connected to the utility power source side.
5. Turn ON the utility power supply to the transfer switch, using the means provided (such as a utility main line circuit breaker).
6. Set the AUTO/OFF/MANUAL switch to AUTO. Then set the generator's main circuit breaker to its ON (or closed) position. The system is now ready for automatic operation.
7. Turn OFF the utility power supply to the transfer switch.

With the AUTO/OFF/MANUAL switch at AUTO, the engine should crank and start when the utility source power is turned OFF. After starting, the transfer switch should connect load circuits to the standby side. Let the system go through its entire automatic sequence of operation.

With the generator running and loads powered by generator AC output, turn ON the utility power supply to the transfer switch. The following should occur:

- After about six seconds, the switch should transfer loads back to the utility power source.
- About one minute after retransfer, the engine should shut down.

2.6 ADJUSTING THE REGULATOR (NATURAL GAS ONLY)

Although the generator has been factory set to provide maximum power, it may be necessary in some areas to adjust this setting. Because natural gas has different BTU or power content across the country the engine may not perform as designed.

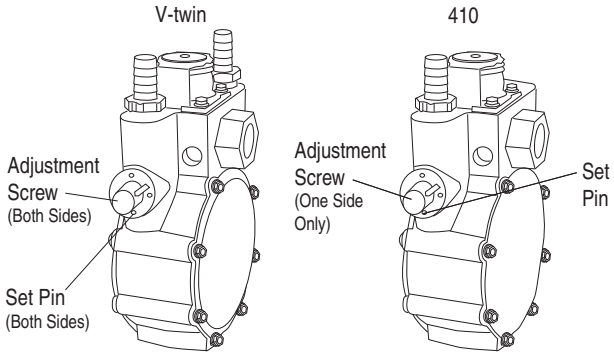
If experiencing engine problems at high or full load conditions follow these steps. It will require a frequency meter to perform this procedure.

1. Turn off utility power to the main distribution panel in the house. This can be done by switching the service main breaker to the off or open position.
2. Allow the generator to start before loading the generator. Confirm the no-load frequency with the roof open and door off is set at 63-63.5 Hz. Transfer load to emergency circuits.
3. Turn on appliances, lights, pumps, etc., that are on the emergency circuits in an attempt to fully load the generator. Be cautious not to overload the generator. Use the following chart as a guide:

Unit	120 Volts	240 Volts
15 kW	108.3 amps	54.2 amps

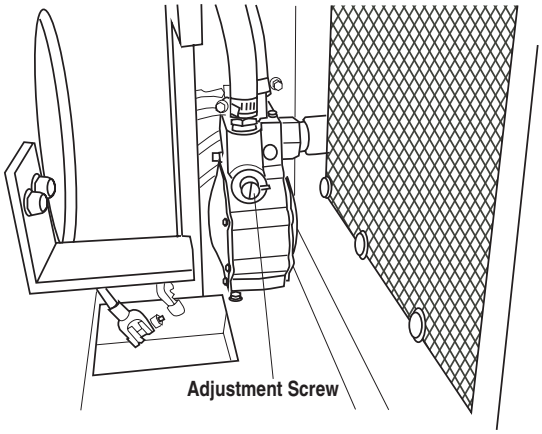
4. When full load has been achieved. Connect a frequency meter to the output lugs of the generator's main line circuit breaker.
5. The fuel regulator is fitted with two adjustment screws. While watching the frequency meter, slowly turn the adjustment screw clockwise or counterclockwise one at a time until highest frequency is read on the meter. Only limited adjustment is available between the set pins. Under no circumstances should any of the pins be removed (Figures 2.1 and 2.2).

Figure 2.1 — Dual Fuel Regulators



6. When the highest frequency is reached maximum power has been set. Then turn both adjustment screws 1/4 turn counterclockwise. Regulator is now set.

Figure 2.2 — Placement of Regulator



7. Turn utility power to the main distribution panel back on. This can be done by switching the service main breaker to the on or closed position. Allow the generator to shut down.

⚠ WARNING ⚠

⚠ Do not make any unnecessary adjustments. Factory settings are correct for most applications. However, when making adjustments, be careful to avoid overspeeding the engine.

If this procedure or equipment are not available, locate the nearest Dealer and they can perform the adjustments.

NOTE:

A service fee may be charged for this adjustment.

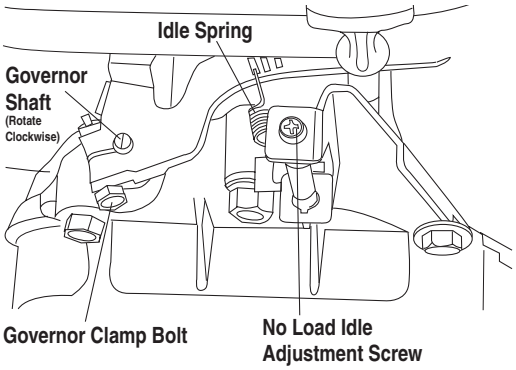
2.7 ENGINE GOVERNOR ADJUSTMENT

If both AC frequency and voltage are correspondingly high or low, adjust the engine governor as follows:

◆ 2.7.1 15 KW UNITS

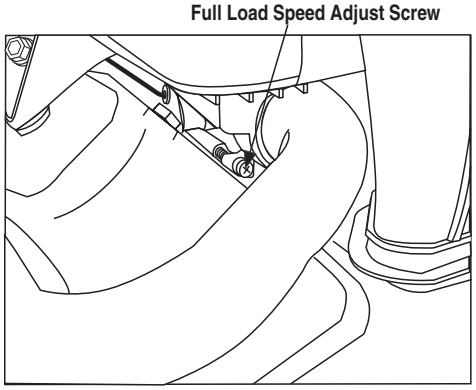
1. Loosen governor clamp bolt (See Figure 2.3).

Figure 2.3 — V-twin Engine Governor Adjustment



2. Completely remove the idle spring.
3. With governor arm at wide open throttle position, rotate governor shaft fully clockwise. Tighten clamp bolt to 84 inch-pounds.
4. Start unit and apply full load. Use full load speed adjust screw (Figure 2.4) to adjust frequency to 58 Hz.
5. Remove load, stop engine, loosen the idle adjust screw and reconnect the idle spring.
6. Push the governor arm to the closed throttle position. Make sure the idle spring does not stretch at all.
7. Restart the unit.
8. Slowly turn the idle adjust screw to adjust the no-load idle frequency to 63-63.5 Hz.
9. The governor is now set.

Figure 2.4 — V-twin Full Load Speed Adjust Screw



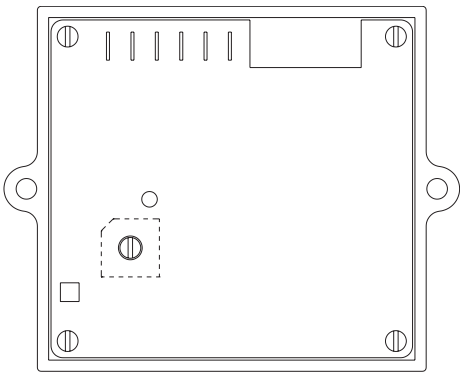
2.8 VOLTAGE REGULATOR ADJUSTMENT

With the frequency between 62-63.5 Hertz, slowly turn the slotted potentiometer (Figure 2.5) until line voltage reads 244-252 volts.

NOTE:

Remove the access panel on top of the control panel to adjust the voltage regulator.

Figure 2.5 – Voltage Adjustment Potentiometer



NOTE:

The voltage regulator is housed above the generator's control panel. The regulator maintains a voltage in direct proportion to frequency. For example, at 62 Hertz, line-to-neutral voltage will be 124 volts.

3.1 BREAK-IN PROCEDURE

Once the unit has been installed and all electrical checks have been made, it is strongly recommended that the following "Break-in Procedure" be completed to ensure correct generator operation in the future.

1. Set the generator's AUTO/OFF/MANUAL switch to AUTO.
2. Turn OFF the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).
3. The unit will start, and the transfer switch will transfer to standby.
4. Using the transfer switch's built-in emergency load center, turn on circuits to load the generator to approximately 25% rated load and run the unit for one hour.
5. Run the unit for one hour at 50% rated load.
6. Run the unit for one hour at 75% rated load.
7. Run the unit for one hour at 100% rated load.
8. Turn ON the utility power supply to the transfer switch, which will allow the transfer switch to transfer back to utility power. The unit will continue to run for one minute and then shut down.

9. Allow the unit to cool.
10. Set the generator's main circuit breaker to its OFF (or OPEN) position.
11. Set the generator's AUTO/OFF/MANUAL switch to OFF. Remove the 7.5A and 15A fuses from the generator control panel. Disconnect the battery cables as outlined in "General Hazards" (page 2).
12. Drain the oil and remove the oil filter. Replace the oil filter according to Section 3.4, "Changing the Oil Filter". Replace the oil with synthetic oil as recommended in Section 3.3, "Changing the Engine Oil".
13. Reconnect the battery cables as outlined in "General Hazards" (page 2) and insert the 7.5A and 15A fuses into the generator control panel. The generator is now ready for service.

3.2 USING THE AUTO/OFF/MANUAL SWITCH (FIGURE 3.1)

◆ 3.2.1 "AUTO" POSITION

Selecting this switch position activates fully automatic system operation. It also permits starting and exercising the engine every seven days with the setting of the exercise timer (see "Setting the Exercise Timer" section). This position also is used for remote starting, when it is set up.

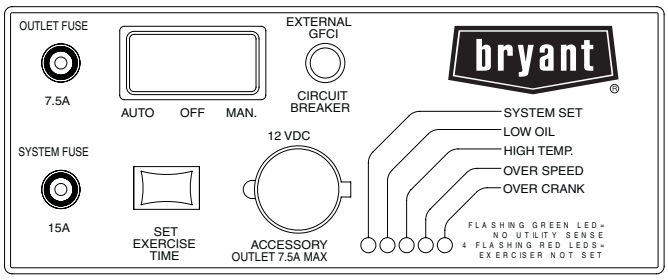
◆ 3.2.2 "OFF" POSITION

This switch position shuts down the engine. This position also prevents automatic operation.

◆ 3.2.3 "MANUAL" POSITION

Set the switch to MANUAL to crank and start the engine. Transfer to standby power will not occur unless there is a utility failure.

Figure 3.1 – Generator Control Panel



⚠ WARNING ⚠

⚠ With the switch set to AUTO, the engine may crank and start at any time without warning. Such automatic starting normally occurs when utility power source voltage drops below a preset level or during the normal exercise cycle. To prevent possible injury that might be caused by such sudden starts, always set the switch to OFF and remove both fuses before working on or around the generator or transfer switch. Then, place a "Do Not Operate" tag on the generator panel and on the transfer switch.

3.3 AUTOMATIC TRANSFER OPERATION

To select automatic operation, do the following:

1. Make sure the transfer switch main contacts are set to their UTILITY position, i.e., loads connected to the utility power source (Figure 3.2).
2. Be sure that normal utility power source voltage is available to transfer switch terminal lugs N1 and N2.
3. Set the generator's AUTO/OFF/MANUAL switch to AUTO.
4. Set the generator's main circuit breaker to its ON (or CLOSED) position.

With the preceding steps complete, the generator will start automatically when utility source voltage drops below a preset level. After the unit starts, loads are transferred to the standby power source. Refer to Section 3.4, "Sequence of Automatic Operation."

◆ 3.3.1 12 VDC ACCESSORY OUTLET

The generator is equipped with a 12 VDC accessory outlet in the generator control panel (Figure 3.1). With the generator running or in standby mode, this outlet may be used to temporarily power low power accessories such as a work light, cell phone, radio or any other automotive style accessory. This outlet is capable of delivering a MAXIMUM of 7.5 amps. If the accessory to be used through this circuit demands too much power, the fuse that protects this circuit will melt open and the circuit will not be functional.

⚠ WARNING ⚠

⚠ This 12 VDC outlet draws power from the generator's starting battery and extended use of this outlet may drain the battery and the engine may not start. This outlet should NOT be used for battery charging.

◆ 3.3.2 120 VAC GFCI OUTLET

The generator is equipped with an external 15 amp, 120 volt, GFCI convenience outlet that is located in the right rear of the generator enclosure. When the generator is running, in the absence of utility power, this outlet may be used to power items outside a home such as lights or power tools. This outlet may also be used when utility power is present by running the generator in manual mode. This outlet does not provide power if the generator is not running. This outlet is protected by a 15 amp circuit breaker located in the generator control panel (Figure 3.1).

3.4 SEQUENCE OF AUTOMATIC OPERATION

The generator's control panel houses a control logic circuit board. This board constantly monitors utility power source voltage. Should that voltage drop below a preset level, circuit board action will signal the engine to crank and start. After the engine starts, the circuit board signals the transfer switch to activate and connect load circuits to the standby power supply (load terminal lugs T1/T2 connect to terminal lugs E1/E2).

Upon restoration of utility source voltage above a preset level, generator circuit board action signals the transfer switch to transfer loads back to that power supply. After retransfer, the engine is signalled to shut down.

The actual sequence of operation is controlled by sensors and timers on a control logic circuit board, as follows:

A. Utility Voltage Dropout Sensor
- This sensor monitors utility source voltage.
- If utility source voltage drops below about 70 percent of the nominal supply voltage, the sensor energizes a 15-second timer.
- Once the timer has expired, the engine will crank and start.

B. Engine Warm-up Time Delay
- This mechanism lets the engine warm up for about 10 seconds before the load is transferred to a standby source.

C. Standby Voltage Sensor
- This sensor monitors generator AC output voltage. When the voltage has reached 50 percent of the nominal rated voltage, transfer to standby can occur.

D. Utility Voltage Pickup Sensor
- This sensor monitors utility power supply voltage. When that voltage is restored to above 70 percent of the nominal source voltage, a retransfer time delay starts timing.

E. Retransfer Time Delay
- This timer runs for about 15 seconds.
- At end of a 15-second delay, circuit board action de-energizes the transfer relay in the transfer switch.
- Retransfer to utility power source then occurs.

F. Engine Cool-down Timer
- When the load is transferred back to utility power source, the engine cool-down timer starts timing.
- The timer will run for about one minute, and the generator will then shut down.

3.5 MANUAL TRANSFER OPERATION

◆ 3.5.1 TRANSFER TO GENERATOR POWER SOURCE

To start the generator and activate the transfer switch manually, proceed as follows:

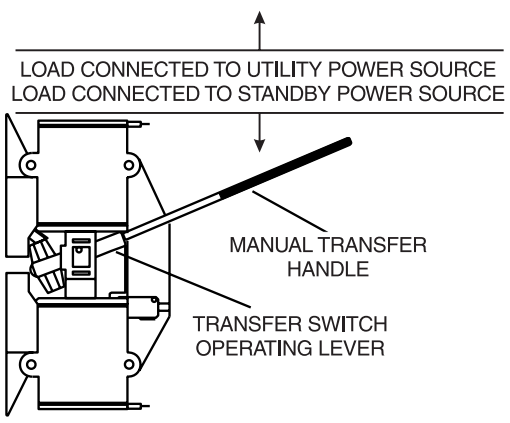
1. Set the generator's AUTO/OFF/MANUAL switch to OFF.
2. Set the generator's main circuit breaker to its OFF (or OPEN) position.
3. Turn OFF the utility power supply to the transfer switch using the means provided (such as a utility main line circuit breaker).

⚠ DANGER ⚠

⚠ Do not attempt to activate the transfer switch manually until all power voltage supplies to the switch have been positively turned off. Failure to turn off all power voltage supplies may result in extremely hazardous and possibly fatal electrical shock.

4. Use the manual transfer handle inside the transfer switch to move the main contacts to their "Standby"position, i.e., loads connected to the standby power source (Figure 3.2).

Figure 3.2 – Manual Transfer Switch Operation


LOAD CONNECTED TO UTILITY POWER SOURCE
LOAD CONNECTED TO STANDBY POWER SOURCE
MANUAL TRANSFER HANDLE
TRANSFER SWITCH OPERATING LEVER

5. To crank and start the engine, set the AUTO/OFF/MANUAL switch to MANUAL.
6. Let the engine stabilize and warm up for a few minutes.
7. Set the generator's main circuit breaker to its ON (or CLOSED) position. The standby power source now powers the loads.

◆ 3.5.2 TRANSFER BACK TO UTILITY POWER SOURCE

When utility power has been restored, transfer back to that source and shut down the generator. This can be accomplished as follows:

1. Set the generator's main circuit breaker to its OFF (or OPEN) position.
2. Let the engine run for a minute or two at no-load to stabilize the internal temperatures.
3. Set the generator's AUTO/OFF/MANUAL switch to its OFF (or OPEN) position. The engine should shut down.
4. Check that utility power supply to the transfer switch is turned OFF.

⚠ DANGER ⚠

⚠ Do not attempt to activate the transfer switch manually until all power voltage supplies to the switch have been positively turned off. Failure to turn off all power voltage supplies may result in extremely hazardous and possibly fatal electrical shock.

5. Use the manual transfer handle inside the transfer switch to move the main contacts back to their UTILITY position, i.e., loads connected to the utility power source (Figure 3.2).
6. Turn ON the utility power supply to the transfer switch using the means provided.
7. Set the system to automatic operation as outlined in "Automatic Transfer Operation," Section 2.3.

3.6 SETTING THE EXERCISE TIMER

The generator is equipped with an exercise timer. Once it is set, the generator will start and exercise once every seven days, on the day of the week and at the time of day the following sequence is completed. During this exercise period, the unit runs for approximately 12 minutes and then shuts down. Transfer of loads to the generator output does not occur during the exercise cycle.

A switch on the control panel (see Figure 3.1) permits selection of the day and time for system exercise. To select the desired day and time of day, the following sequence must be performed at that time.

1. Verify that the AUTO/OFF/MANUAL switch is set to AUTO.
2. Hold down the set timer switch until the generator starts (approximately 10 seconds) and then release.
3. The generator will start and run for approximately 12 minutes and then shut down on its own. The exerciser will then be set to run at that time of day every week.

NOTE:

The exerciser will only work in the AUTO mode and will not work unless this procedure is performed. The exerciser will need to be reset every time the 12-volt battery is disconnected and then reconnected. The exerciser WILL NOT work if dip switch 2 (Remote Not Auto) on the controller printed circuit board is ON.

3.7 PROTECTION SYSTEMS

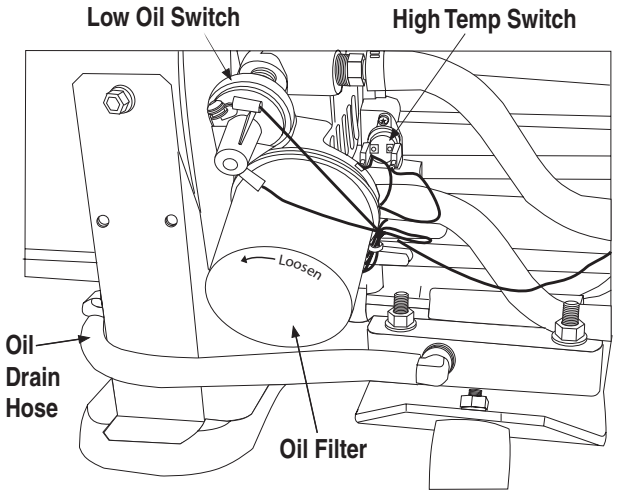
◆ 3.7.1 LOW OIL PRESSURE SWITCH

This switch (Figure 3.3) has normally closed contacts that are held open by engine oil pressure during cranking and operating. Should oil pressure drop below the 8 psi range, switch contacts close, and the engine shuts down. The unit should not be restarted until oil is added, and the AUTO/OFF/MANUAL switch must be turned to OFF and then back to AUTO.

◆ 3.7.2 HIGH TEMPERATURE SWITCH

This switch's contacts (Figure 3.3) close if the temperature should exceed approximately 140° C (284° F), initiating an engine shutdown. The generator will automatically restart and the LED will reset once the temperature has returned to a safe operating level.

Figure 3.3 – Low Oil Pressure and High Temperature Switches



◆ 3.7.3 OVERCRANK

This feature prevents the generator from damaging itself when it continually attempts to start and another problem, such as no fuel supply, prevents it from starting. The unit will crank and rest for a preset time limit. Then, it will stop cranking, and the LED will light indicating an overcrank failure. The AUTO/OFF/MANUAL switch will need to be set to OFF and then back to AUTO to reset the generator control board.

NOTE:

If the fault is not repaired, the overcrank feature will continue to activate.

3.7.3.1 Approximate Crank Cycle Times

- 15 seconds ON
- 7 seconds OFF
- 7 seconds ON
- 7 seconds OFF
- Repeat for 45 seconds
  Approximately 90 seconds total

◆ 3.7.4 OVERSPEED

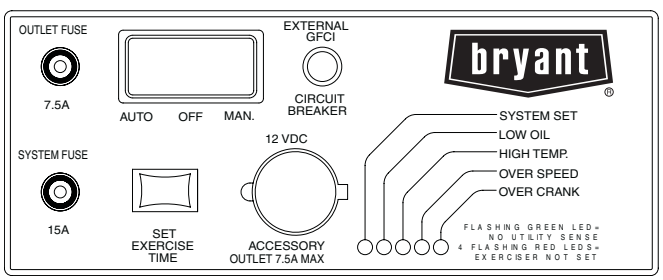
This feature protects the generator from damage by shutting it down if it happens to run faster than the preset limit. This protection also prevents the generator from supplying an output that could potentially damage appliances connected to the generator circuit. Contact the nearest dealer if this failure occurs.

4.1 FUSES

The generator panel's 15 amp fuse (Figure 4.1) protects the DC control circuit against overload. The fuse is wired in series with the battery output lead to the panel. If the fuse element has melted open, the engine cannot crank or start. Replace the fuse using only an identical 15-amp replacement.

The generator panel's 7.5 amp fuse protects the 12 VDC accessory socket. If the fuse element has melted open, the 12 VDC socket will not provide power to any accessories. Replace the fuse using only an identical 7.5 amp replacement. To remove fuse, push the fuse holder cap down and rotate counterclockwise.

Figure 4.1 – Generator Control Panel



4.2 CHECKING THE ENGINE OIL LEVEL

For oil capacities, see the "Specifications," Section. For engine oil recommendations, see Section 4.3.1. To check the engine oil level, proceed as follows (Figure 4.2):

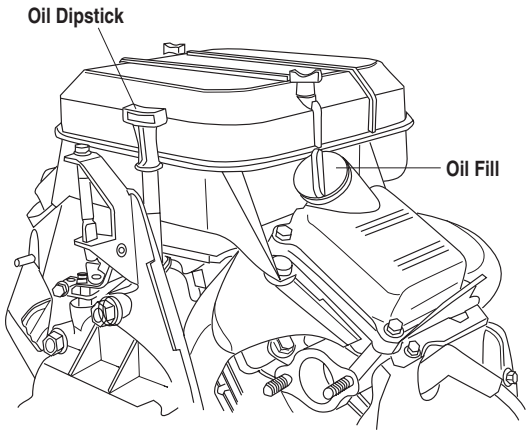
1. Start the generator by moving the AUTO/OFF/MANUAL switch to the MANUAL position. Allow it to run for a short while and then shut it down by moving the switch to the OFF position.
2. Remove the dipstick and wipe it dry with a clean cloth.
3. Install the dipstick; then, remove it again. The oil level should be at the dipstick "Full" mark. If necessary, add oil to the "Full" mark only. DO NOT FILL ABOVE THE "FULL" MARK.

CAUTION

⚠ **Never operate the engine with the oil level below the "Add" mark on the dipstick. Doing this could damage the engine.**

4. Install the dipstick.
5. Reset the AUTO/OFF/MANUAL switch to its original position.

Figure 4.2 — Oil Dipstick and Fill, 15 kW



4.3 CHANGING THE ENGINE OIL

◆ 4.3.1 ENGINE OIL RECOMMENDATIONS

Use oil of American Petroleum Institute (API) Service Class SG, SH or SJ. Use all season SAE 5W-30 Synthetic oil. Organic break-in oil is required before using synthetic oil.

NOTE:

The unit is supplied with "break-in" oil. See the "Break-in Procedure" Section for the first required oil change.

CAUTION

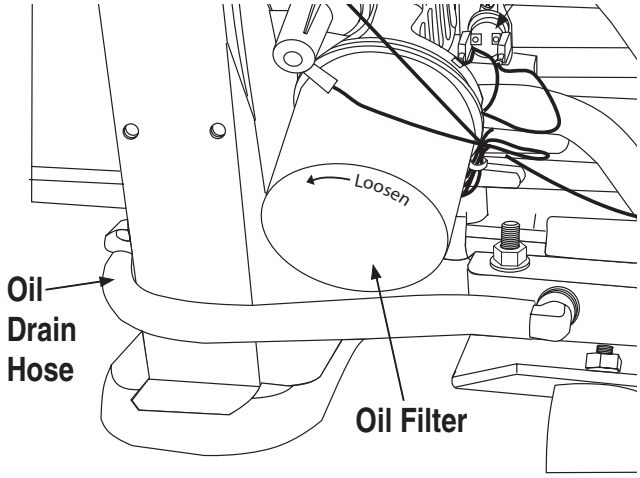
Any attempt to crank or start the engine before it has been properly serviced with the recommended oil may result in an engine failure.

◆ 4.3.2 OIL CHANGE PROCEDURE

To change the oil, proceed as follows:

1. Run the engine until it is thoroughly warmed up then shut OFF the engine.
2. Immediately after the engine shuts OFF, pull the oil drain hose (Figure 4.3) free of its retaining clip. Remove the cap from the hose and drain the oil into a suitable container.
3. After the oil has drained, replace the cap onto the end of the oil drain hose. Retain the hose in the clip.
4. Refill with the proper recommended oil (see "Engine Oil Recommendations"). See the "Specifications" Section for oil capacities.

Figure 4.3 – Oil Drain Hose and Filter



4.4 CHANGING THE OIL FILTER

Change the engine oil filter as follows:

1. With the oil drained, remove the old oil filter by turning it counterclockwise.
2. Apply a light coating of clean engine oil to the gasket of the new filter. See the "Specifications" Section for recommended filter.
3. Screw the new filter on by hand until its gasket lightly contacts the oil filter adapter. Then, tighten the filter an additional 3/4 to one turn (Figure 4.4).
4. Refill with the proper recommended oil (see "Engine Oil Recommendations"). See the "Specifications" Section for oil capacities.
5. Start the engine and check for leaks.

4.5 CHANGING THE ENGINE AIR CLEANER

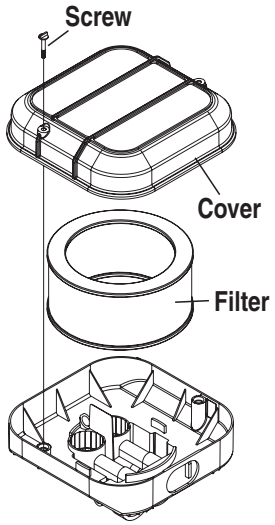
◆ 4.5.1 15 KW GENERATORS

See Figure 4.4, for the location of the air cleaner. Use the following procedure:

1. Turn the two screws counterclockwise to loosen.
2. Remove the cover and air filter.
3. Wipe away dust or debris from inside of the air box and around edges.
4. Install the new air cleaner into the air box.
5. Install the cover. Turn the two cover screws clockwise to tighten.

See the "Service Schedule," Section for air cleaner maintenance. See the "Specifications" Section for air filter replacement part number.

Figure 4.4 — 15 kW Engine Air Cleaner

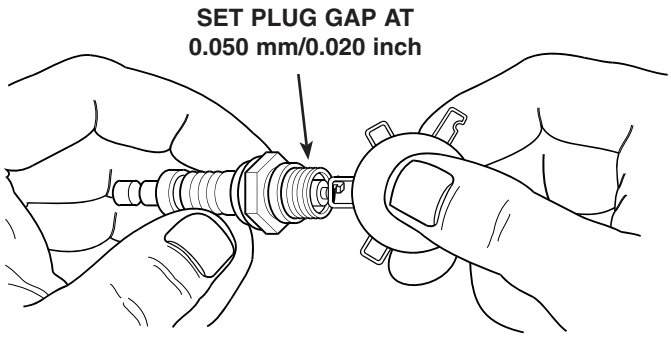


4.6 SPARK PLUG(S)

Reset the spark plug(s) gap or replace the spark plug(s) as necessary. See the "Service Schedule" Section for maintenance requirements.

1. Clean the area around the base of the spark plug(s) to keep dirt and debris out of the engine. Clean by scraping or washing using a wire brush and commercial solvent. Do not blast the spark plug(s) to clean.
2. Remove the spark plug(s) and check the condition. Replace the spark plug(s) if worn or if reuse is questionable. See the "Service Schedule" Section for recommended inspection.
3. Check the spark plug gap using a wire feeler gauge. Adjust the gap to 0.50 mm (0.020 inch) for 15 kW by carefully bending the ground electrode (Figure 4.5).

Figure 4.5 – Setting the Spark Plug Gap



4.7 BATTERY MAINTENANCE

The battery should be inspected per the "Service Schedule". The following procedure should be followed for inspection:

1. Inspect the battery posts and cables for tightness and corrosion. Tighten and clean as necessary.
2. Check the battery fluid level of unsealed batteries and, if necessary, fill with DISTILLED WATER ONLY. DO NOT USE TAP WATER IN BATTERIES.
3. Have the state of charge and condition checked. This should be done with an automotive-type battery hydrometer.

⚠ DANGER ⚠

Do not dispose of the battery in a fire. The battery is capable of exploding.

A battery presents a risk of electrical shock and high short circuit current. The following precautions are to be observed when working on batteries:

- **Remove watches, rings or other metal objects;**
- **Use tools with insulated handles;**
- **Wear rubber gloves and boots;**
- **Do not lay tools or metal parts on top of the battery; and**
- **Disconnect charging source prior to connecting or disconnecting battery terminals;**
- **Remove the 7.5A and 15A fuses from the generator control panel.**

⚠ WARNING ⚠

Do not open or mutilate the battery. Released electrolyte has been known to be harmful to the skin and eyes, and to be toxic.

The electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following procedures are to be observed:

- **Wear full eye protection and protective clothing;**
- **Where electrolyte contacts the skin, wash it off immediately with water;**
- **Where electrolyte contacts the eyes, immediately flush thoroughly with water and seek medical attention; and**
- **Spilled electrolyte is to be washed down with an acid neutralizing agent. A common practice is to use a solution of 1 pound (500 grams) bicarbonate of soda to 1 gallon (4 liters) or water. The bicarbonate of soda solution is to be added until the evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.**

Lead-acid batteries present a risk of fire because they generate hydrogen gas. The following procedures are to be followed:

- **DO NOT SMOKE when near the battery;**
- **DO NOT cause flame or spark in battery area; and**
- **Discharge static electricity from body before touching the battery by first touching a grounded metal surface.**

Be sure the AUTO/OFF/MANUAL switch is set to the OFF position before connecting the battery cables. If the switch is set to AUTO or MANUAL, the generator can crank and start as soon as the battery cables are connected.

Be sure the UTILITY power supply is turned OFF, and the 7.5A and 15A fuses are removed from the generator control panel, or sparking may occur at the battery posts as the cables are attached, causing an explosion.

4.8 ADJUSTING VALVE CLEARANCE

After the first six (6) months of operation, adjust the valve clearance in the engine.

Important: If feeling uncomfortable about doing this procedure or the proper tools are not available, please contact the dealer for service assistance. This is a very important step to insure longest life for the engine.

To adjust valve clearance:

- Make sure the engine is at room temperature.
- Make sure that the spark plug wire is removed from the spark plug and out of the way.
- Remove the four screws attaching the valve cover with a #2 or #3 phillips screwdriver.

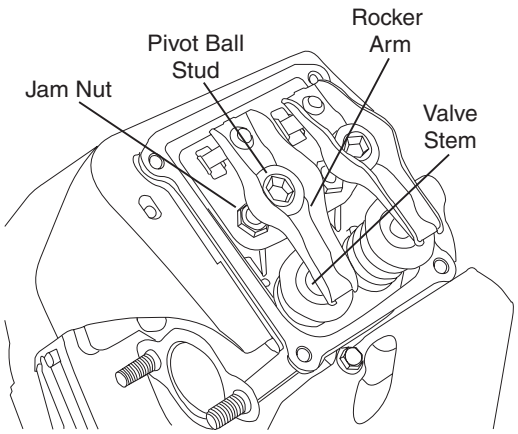
- Make sure the piston is at Top Dead Center (TDC) of its compression stroke (both valves closed). To get the piston at TDC, remove the intake screen at the front of the engine to gain access to the flywheel nut. Use a large socket and socket wrench to rotate the nut and hence the engine. While watching the piston through the spark plug hole. The piston should move up and down. The piston is at TDC when it is up as high as it can go.
- Loosen the rocker jam nut. Use an 10mm allen wrench to turn the pivot ball stud while checking clearance between the rocker arm and the valve stem with a feeler gauge. Correct clearance is 0.002-0.004 inch (0.05-0.1 mm). See Figure 4.6.

NOTE:

Hold the rocker arm jam nut in place as the pivot ball stud is turned.

When valve clearance is correct, hold the pivot ball stud in place with the allen wrench and tighten the rocker arm jam nut. Tighten the jam nut to 174 in/lbs. torque. After tightening the jam nut, recheck valve clearance to make sure it did not change.

Figure 4.6 - Valve Clearance Adjustment



- Install new valve cover gasket.
- Re-attach the valve cover.

NOTE:

Start all four screws before tightening or it will not be possible to get them in place. Make sure the valve cover gasket is in place.

- Re-attach the spark plug wire to the spark plug.
- Repeat the process for the other cylinder.

4.9 COOLING SYSTEM

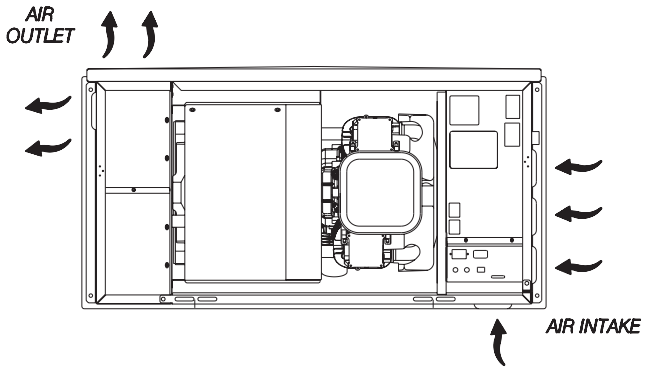
Air inlet and outlet openings in the generator compartment must be open and unobstructed for continued proper operation. This includes such obstructions as high grass, weeds, brush, leaves and snow.

Without sufficient cooling and ventilating air flow, the engine/generator quickly overheats, which causes it to quickly shut down. (See Figure 4.7 for vent locations.)

⚠ WARNING ⚠

⚠ The exhaust from this product gets extremely hot and remains hot after shutdown. High grass, weeds, brush, leaves, etc. must remain clear of the exhaust. Such materials may ignite and burn from the heat of the exhaust system.

Figure 4.7 – Cooling Vent Locations



⚠ CAUTION ⚠

⚠ The maximum ambient temperature for the generator is 48.9° C (104° F).

4.10 ATTENTION AFTER SUBMERSION

If the generator has been submerged in water, it **MUST NOT** be started and operated. Following any submersion in water, have a dealer thoroughly clean and dry the generator.

4.11 CORROSION PROTECTION

Periodically wash and wax the enclosure using automotive type products. Frequent washing is recommended in salt water/coastal areas. Spray engine linkages with a light oil such as WD-40.

◆ 4.11.1 ADDITIONAL CORROSION PROTECTION

Periodically spray all engine linkage parts and brackets with corrosion inhibiting spray such as WD-40 or a comparable product.

4.12 OUT OF SERVICE PROCEDURE

◆ 4.12.1 REMOVAL FROM SERVICE

If the generator cannot be exercised every seven days, and will be out of service longer than 90 days, prepare the generator for storage as follows:

1. Start the engine and let it warm up.
2. Close the fuel shutoff valve in the fuel supply line and allow the unit to shut down.
3. Once the unit has shut down, it will signal a low oil fault.
4. Set the generator's main circuit breaker to its OFF (or open) position.
5. Set the Auto/Off/Manual switch to OFF and turn off the utility power to the transfer switch. Remove the 7.5A and 15A fuses from the generator control panel. Disconnect the battery cables as outlined in "General Hazards" (page 2). Turn on the utility power supply to the transfer switch in order to power the emergency load centers circuits while utility power is available.
6. While the engine is still warm from running, drain the oil completely. Refill the crankcase with oil. See "Engine Oil Recommendations," Section.
7. Attach a tag to the engine indicating the viscosity and classification of the oil in the crankcase.
8. Remove the spark plug(s) and spray fogging agent into the spark plug(s) threaded openings. Reinstall and tighten the spark plug(s).
9. Remove the battery and store it in a cool, dry room on a wooden board. Never store the battery on any concrete or earthen floor.
10. Clean and wipe the entire generator.

◆ 4.12.2 RETURN TO SERVICE

To return the unit to service after storage, proceed as follows:

1. Verify that utility power is turned off and that the Auto/Off/Manual switch is set to OFF.
2. Check the tag on the engine for oil viscosity and classification. Verify that the correct recommended oil is used in the engine (see "Engine Oil Recommendations"). If necessary, drain and refill with the proper oil.
3. Check the state of the battery. Fill all cells of unsealed batteries to the proper level with distilled water. DO NOT USE TAP WATER IN THE BATTERY. Recharge the battery to 100 percent state of charge, or, if defective, replace the battery. See the "Specifications" Section, for type and size.
4. Clean and wipe the entire generator.
5. Remove the 7.5A and 15A fuses from the generator control panel. Reconnect the battery. Observe battery polarity. Damage may occur if the battery is connected incorrectly.
6. Open the fuel shutoff valve.
7. Insert the 7.5A and 15A fuses into the generator control panel. Start the unit by moving the Auto/Off/Manual switch to MANUAL. Allow the unit to warm up thoroughly.
8. Stop the unit by setting the Auto/Off/Manual switch to OFF.
9. Turn on the utility power to the transfer switch.
10. Set the Auto/Off/Manual switch to AUTO.
11. The generator is now ready for service.

NOTE:

If the battery was dead or disconnected, the exercise timer must be reset.

4.13 SERVICE SCHEDULE

ATTENTION: It is recommended that all service work be performed by the nearest dealer.

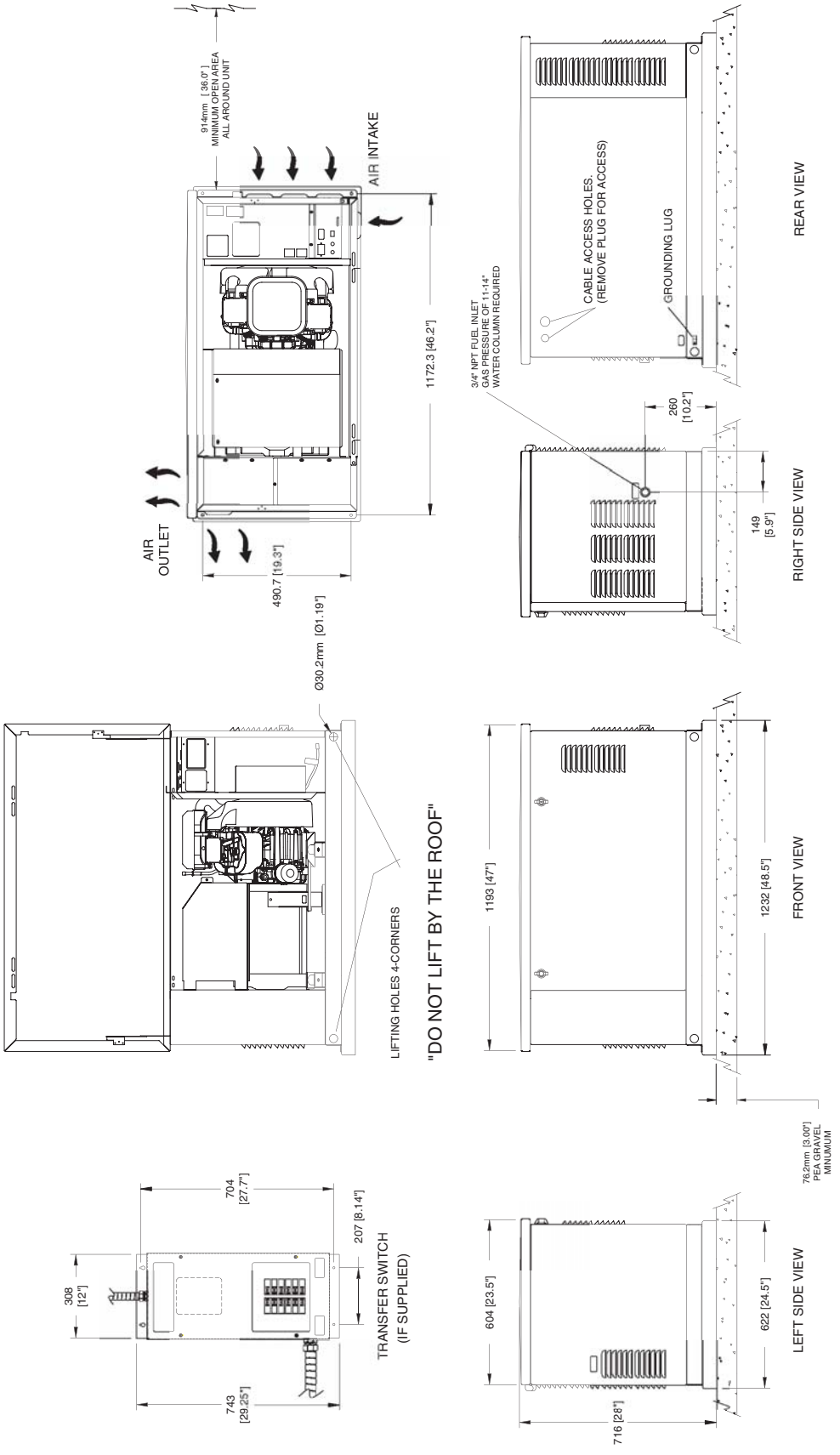
SYSTEM/COMPONENT	PROCEDURE			FREQUENCY
X = Action R = Replace as Necessary * = Notify Dealer if Repair is Needed.	Inspect	Change	Clean	W = Weekly M = Monthly Y = Yearly
FUEL				
Fuel lines and connections*	X			M
LUBRICATION				
Oil level	X			M
Oil		X		AFTER BREAK-IN, AND Y
Oil filter		X		AFTER BREAK-IN, AND Y
COOLING				
Enclosure louvers	X		X	W
BATTERY				
Remove corrosion, ensure dryness	X		X	M
Clean and tighten battery terminals	X		X	M
Check charge state	X	R		EVERY 6 M
Electrolyte level (unsealed batteries only)*	X	R		EVERY 6 M
ENGINE AND MOUNTING				
Air cleaner	X	R		Y
Spark plug(s)	X	R		Y
GENERAL CONDITION				
Vibration, Noise, Leakage, Temperature*	X			M
COMPLETE TUNE-UP*	TO BE COMPLETED BY A DEALER			

5.1 TROUBLESHOOTING GUIDE

Problem	Cause	Correction
The engine will not crank.	1. Fuse blown	1. Replace 15A fuse on generator control panel.
	2. Loose, corroded or defective battery cables	2. Tighten, clean or replace as necessary.
	3. Defective starter contactor (7 kW)	3. *
	4. Defective starter motor	4. *
	5. Dead Battery	5. Charge or replace battery.
The engine cranks but will not start.	1. Out of fuel	1. Replenish fuel.
	2. Defective fuel solenoid (FS)	2. *
	3. Open #14 wire from engine control board	3. *
	4. Defective spark plug(s)	4. Clean, re-gap or replace plug(s).
	5. Valve lash out of adjustment.	5. Reset valve lash.
The engine starts hard and runs rough.	1. Air cleaner plugged or damaged	1. Check, replace air cleaner.
	2. Defective spark plug(s)	2. Clean, re-gap or replace plug(s).
	3. Fuel regulator not set.	3. Set fuel regulator.
	4. Fuel pressure incorrect.	4. Confirm fuel pressure is at (0.4-0.5 psi) for LP, and 5-7" water column (0.18-0.25 psi) for natural gas.
The AUTO/OFF/MANUAL switch is set to OFF, but the engine continues to run.	1. Defective switch	1. *
	2. AUTO/OFF/MANUAL switch wired incorrectly	2. *
	3. Defective control board	3. *
There is no AC output from the generator.	1. Main line circuit breaker open	1. Reset circuit breaker to ON (or closed).
	2. Generator internal failure	2. *
There is no transfer to standby after utility source failure.	1. Defective transfer switch coil	1. *
	2. Defective transfer relay	2. *
	3. Transfer relay circuit open	3. *
	4. Defective control logic board	4. *
Unit consumes large amounts of oil.	1. Break-in procedure not followed	1. *

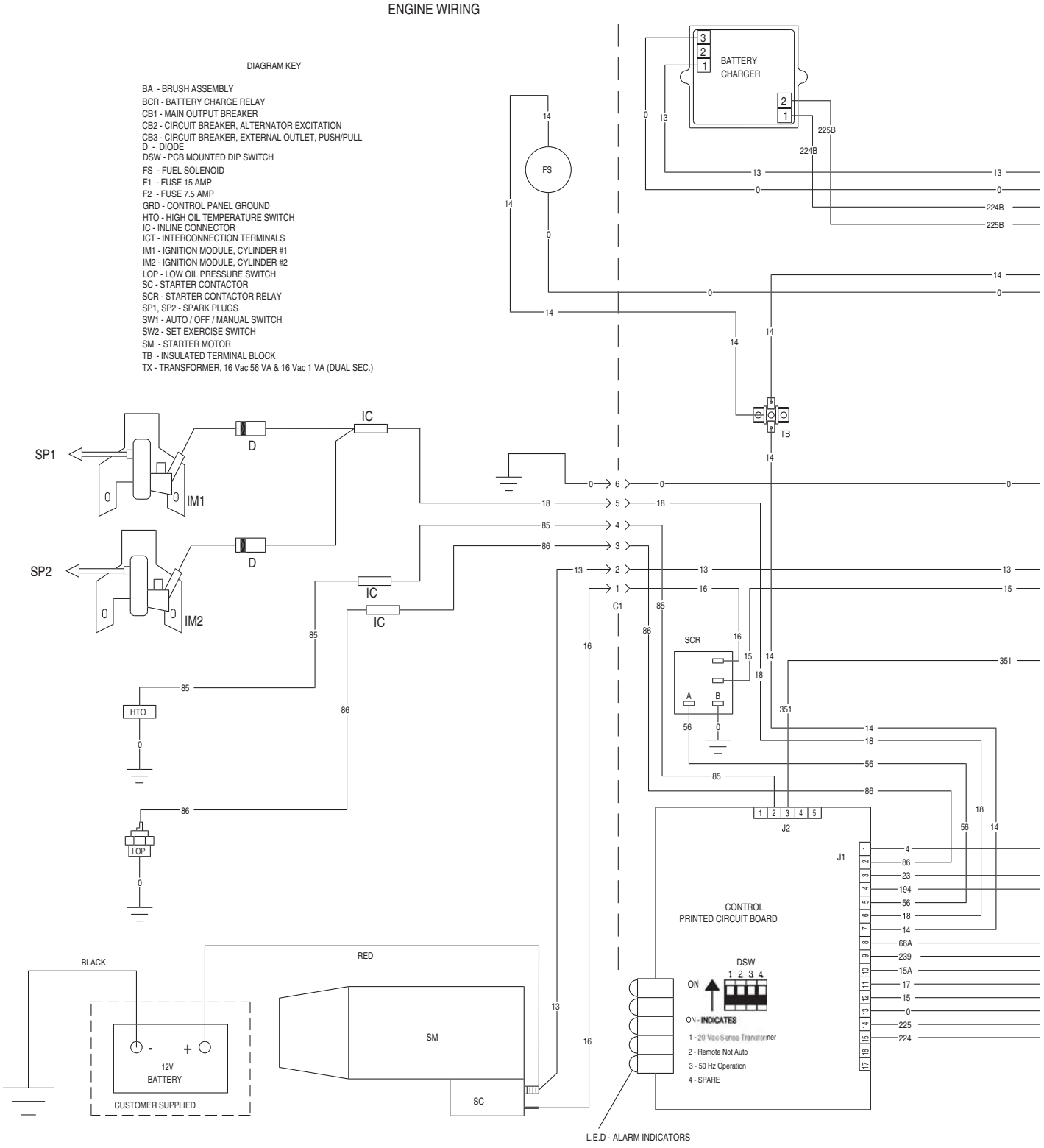
***Contact the nearest dealer for assistance.**

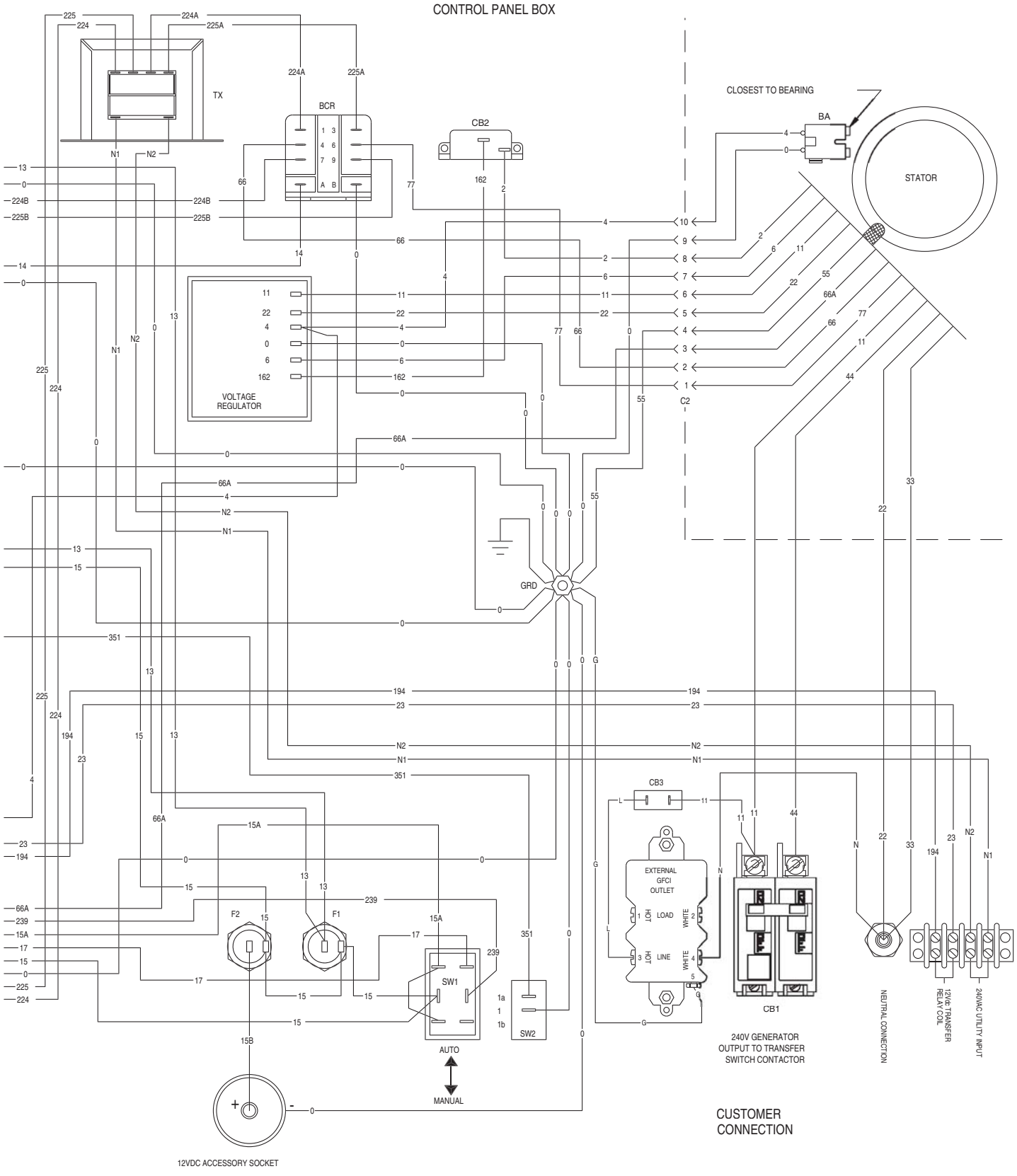
15 kW Generator
Drawing No. 0D3739-B



**ALL DIMENSIONS IN:
MILLIMETERS [INCHES]

15 kW Generator
Wiring Diagram – Drawing No. 0E9016




CONTROL PANEL BOX
TX
BCR
CB2
CLOSEST TO BEARING
BA
STATOR
VOLTAGE REGULATOR
C2
GRD
CB3
EXTERNAL GFCI OUTLET
LOAD
LINE
CB1
240V GENERATOR OUTPUT TO TRANSFER SWITCH CONTACTOR
NEUTRAL CONNECTION
12Vdc TRANSFER RELAY COIL
240VAC UTILITY INPUT
F1
F2
SW1
SW2
AUTO
MANUAL
12VDC ACCESSORY SOCKET
CUSTOMER CONNECTION

15 kW Generator
Electrical Schematic – Drawing No. 0E9017

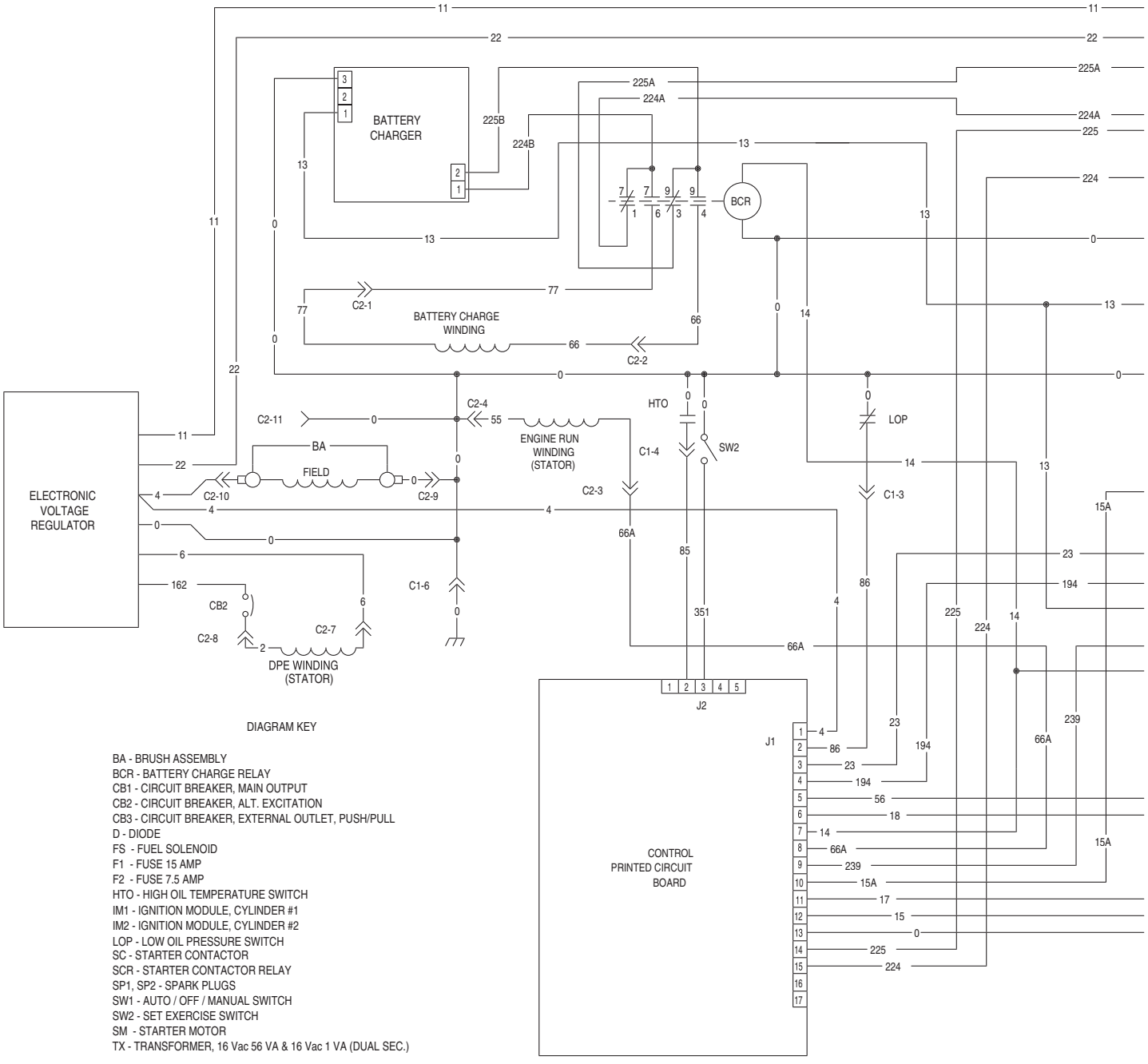
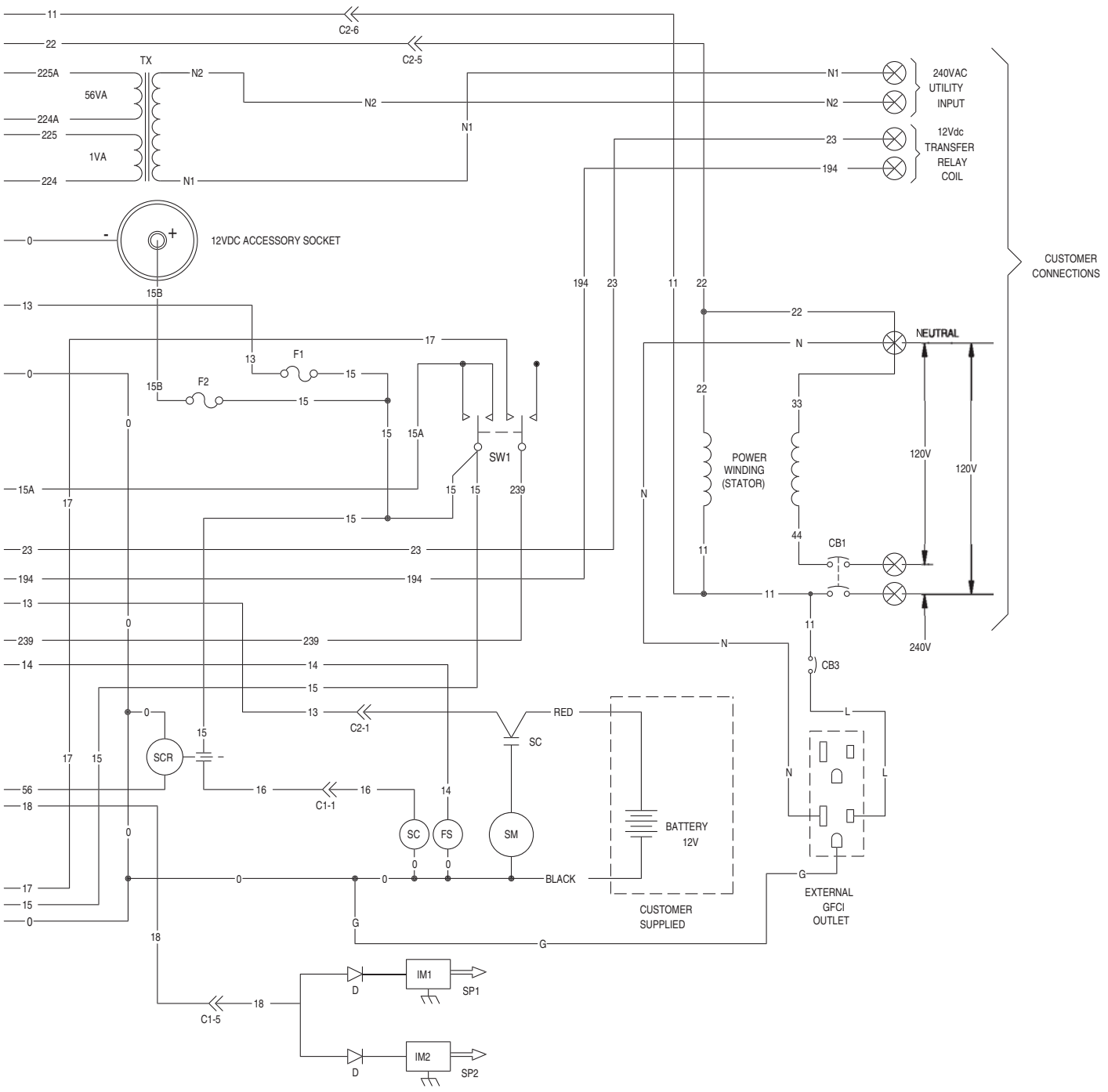
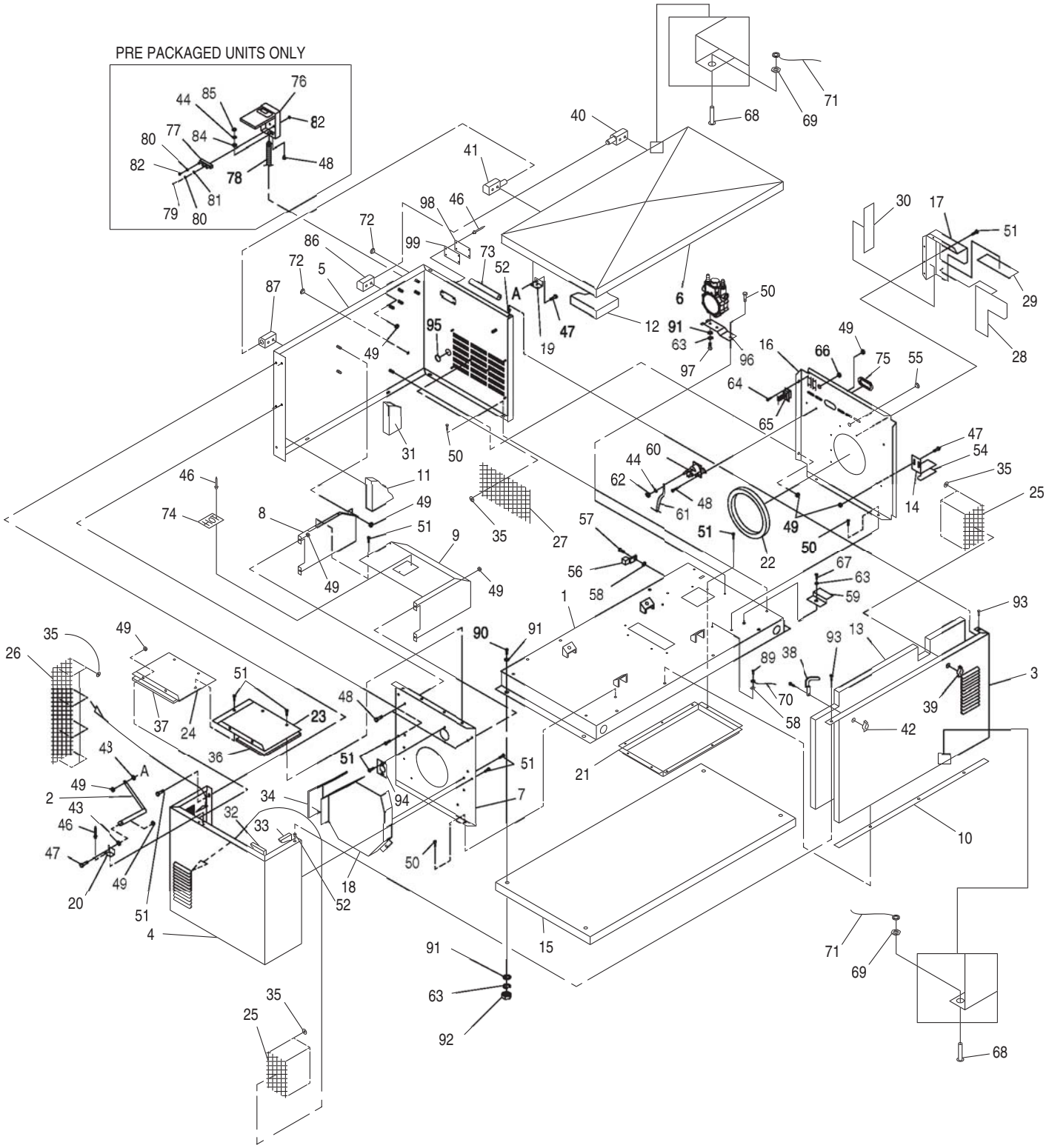


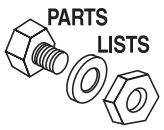
DIAGRAM KEY

BA - BRUSH ASSEMBLY
BCR - BATTERY CHARGE RELAY
CB1 - CIRCUIT BREAKER, MAIN OUTPUT
CB2 - CIRCUIT BREAKER, ALT. EXCITATION
CB3 - CIRCUIT BREAKER, EXTERNAL OUTLET, PUSH/PULL
D - DIODE
FS - FUEL SOLENOID
F1 - FUSE 15 AMP
F2 - FUSE 7.5 AMP
HTO - HIGH OIL TEMPERATURE SWITCH
IM1 - IGNITION MODULE, CYLINDER #1
IM2 - IGNITION MODULE, CYLINDER #2
LOP - LOW OIL PRESSURE SWITCH
SC - STARTER CONTACTOR
SCR - STARTER CONTACTOR RELAY
SP1, SP2 - SPARK PLUGS
SW1 - AUTO / OFF / MANUAL SWITCH
SW2 - SET EXERCISE SWITCH
SM - STARTER MOTOR
TX - TRANSFORMER, 16 Vac 56 VA & 16 Vac 1 VA (DUAL SEC.)


11
22
C2-6
C2-5
TX
225A
56VA
224A
225
1VA
224
N2
N1
240VAC UTILITY INPUT
12Vdc TRANSFER RELAY COIL
23
194
0
12VDC ACCESSORY SOCKET
15B
CUSTOMER CONNECTIONS
13
17
F1
F2
15
15A
SW1
239
NEUTRAL
N
POWER WINDING (STATOR)
33
120V
44
CB1
CB3
240V
L
14
16
C1-1
C2-1
RED
SC
SCR
56
18
FS
SM
BATTERY 12V
BLACK
CUSTOMER SUPPLIED
EXTERNAL GFCI OUTLET
G
D
IM1
SP1
IM2
SP2
C1-5

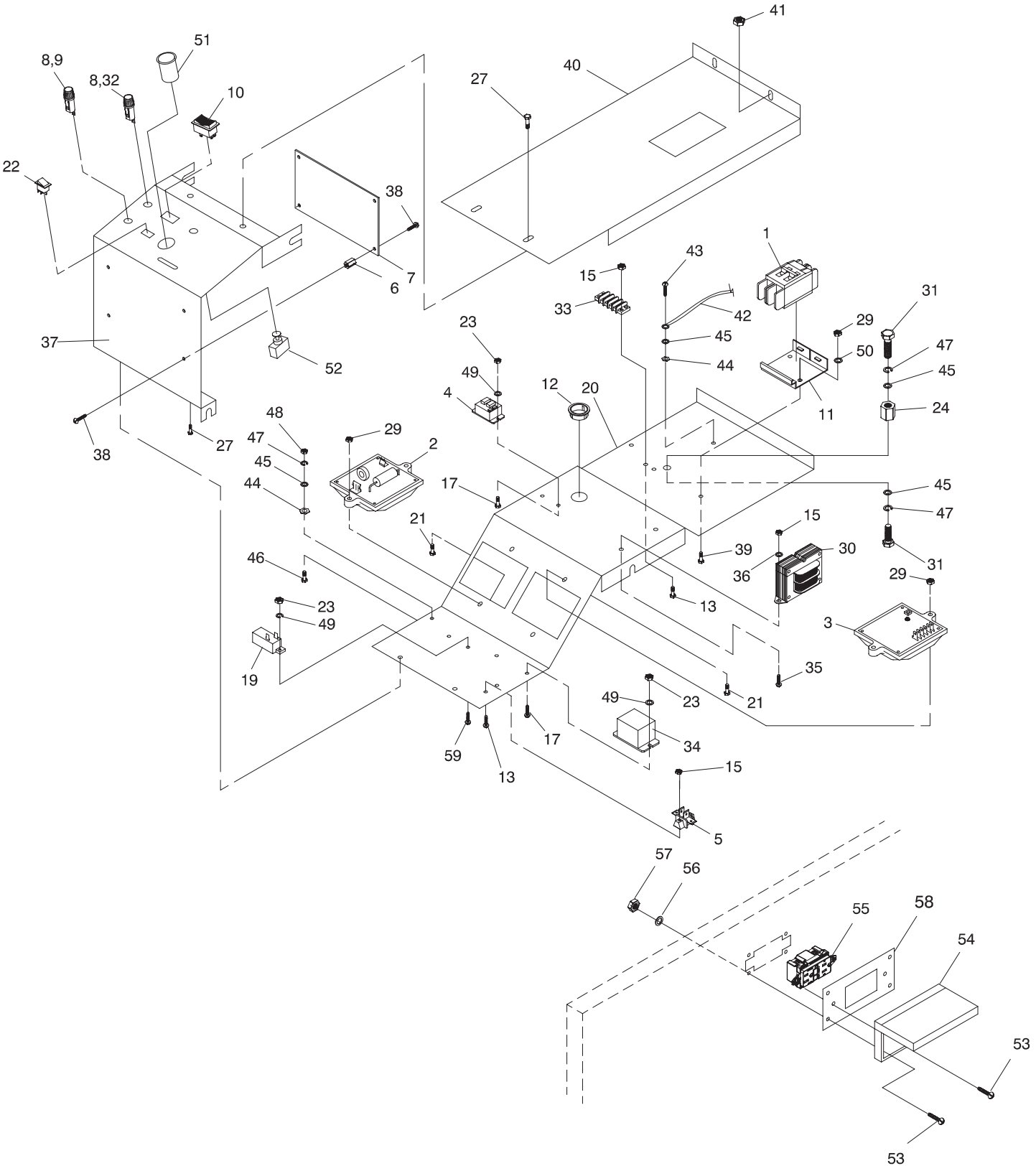
15 kW Generator
Enclosure – Drawing No. 0F0080-C

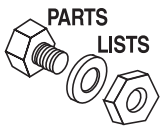




ITEM	PART NO.	QTY.	DESCRIPTION
1	0C6140	1	ASSEMBLY, ENCLOSURE BASE
	0D1901	1	ASSEMBLY, ENCLOSURE BASE (7KW)
2	0C6735	2	SUPPORT, ROOF FOLDING
3	0F0063	1	ENCLOSURE, FRONT
4	0C7062	1	ENCLOSURE, EXHAUST SIDE
	0C7062A	1	ENCLOSURE, EXHAUST SIDE (7KW)
5	0E8811	1	ENCLOSURE, SIDE & BACK
	0E8811A	1	ENCLOSURE, SIDE & BACK (7KW)
6	0E9873	1	ENCLOSURE, ROOF
7	0C7065	1	PANEL, ALTERNATOR DIVIDER
	0C7065A	1	PANEL, ALTERNATOR DIVIDER (7KW)
8	0C8101A	1	PANEL, MUFFLER BOX SIDE
	0C8861	1	PANEL, MUFFLER BOX SIDE (7KW)
9	0C8101B	1	COVER, MUFFLER BOX
	0C8862	1	COVER, MUFFLER BOX (7KW)
10	0C8283	1	GASKET, DOOR SEAL
11	0C8284A	1	FOAM, BACK ENCLOSURE
12	0C8284B	1	FOAM, ROOF ENCLOSURE
13	0C8284C	1	FOAM, FRONT ENCLOSURE
14	0C8285	1	BRACKET, BATTERY SUPPORT
15	0C8899A	1	PAD, 24"X48" WITH MOUNTING HOLES
16	0D1128	1	PANEL, ENGINE DIVIDER
	0D1128A	1	PANEL, ENGINE DIVIDER (7KW)
17	0E4244	1	BAFFLE, INTAKE
	0D1605A	1	BAFFLE, INTAKE (7KW)
18	0D1606	1	HOUSING, FAN
	0D5264	1	BAFFLE, EXHAUST (7KW)
19	0D1839	2	BRACKET, TOP SUPPORT
20	0D1840	2	BRACKET, BOTTOM SUPPORT
21	0D2425	1	DUCT, BASE AIR
22	0D2588	1	GASKET, FRONT DIVIDER
	0D2588A	1	GASKET, FRONT DIVIDER (7KW)
23	0D2676	1	COVER, FRONT EXHAUST ENCLOSURE
24	0D2677	1	COVER, BACK EXHAUST ENCLOSURE
25	0D2979B	2	CLOTH, HARDWARE 266.7mm x 146mm
	0D2979B	3	CLOTH, HARDWARE 266.7mm x 146mm (7KW)
26	0D2979C	1	CLOTH, HARDWARE 543mm x 146mm
27	0D2979D	1	CLOTH, HARDWARE 266.7mm x 387.4mm
	0D2979E	1	CLOTH, HARDWARE (7KW)
28	0E4245	1	FOAM, FRONT INTAKE BAFFLE
	0D3058A	1	FOAM, FRONT INTAKE BAFFLE (7KW)
29	0E4245A	1	FOAM, TOP INTAKE BAFFLE
30	0E4245B	1	FOAM, BACK INTAKE BAFFLE
	0D3058C	1	FOAM, BACK INTAKE BAFFLE (7KW)
31	0D3057D	1	FOAM, BACK ENCL. STRIP
32	0D3059A	1	FOAM, EXHAUST SIDE ENCLOSURE END
33	0D3059B	1	FOAM, EXHAUST SIDE ENCLOSURE FRONT
34	0D3059C	1	FOAM, EXHAUST FAN HOUSING
35	0D7176	24	WASHER, SELF LOCKING
		22	WASHER, SELF LOCKING (7KW)
36	0D3059D	1	FOAM, FRONT EXHAUST ENCLSURE COVER
37	0D3059E	1	FOAM, BACK EXHAUST ENCLOSURE COVER
38	0C7781A	2	DOOR, PAWL
39	0D3037	1	LATCH, QUARTER TURN LOCKING
40	0F0164	1	HINGE TYPE A WITH STUDS, PIN
41	0F0165	1	HINGE TYPE B WITH STUDS, PIN
42	0D3037A	1	LATCH, QUARTER TURN NON-LOCKING
43	0A2115	4	WASHER NYLON .250"
44	022097	1	WASHER LOCK M6-1/4"
46	0F0710	18	RIVET POP 0.125 X 0.337
47	047411	6	SCREW HHC M6-1.0 X 16 G8.8
	047411	4	SCREW HHC M6-1.0 X 16 G8.8 (7KW)
48	043116	5	SCREW HHC M6-1.0 X 12 G8.8
	043116	6	SCREW HHC M6-1.0 X 12 G8.8 (7KW)
49	0D3700	26	NUT, LOCKING FLANGE M6-1.0
	0D3700	24	NUT, LOCKING FLANGE M6-1.0 (7KW)
50	0D4662	11	SCREW HHTT M8-1.2 X 20 BP
51	090388	36	SCREW TAPTITE M6-1.0 X 12 BP
		24	SCREW TAPTITE M6-1.0 X 12 BP (7KW)
52	092120	2	NUT LOCK TRIC M6 X 1.0 Y/ZNC
54	0D3167	1	GASKET, BATTERY SUPPORT BRACKET
55	0A3328	1	PLUG, PLASTIC 0.593
56	055414	1	LUG SLDLSS #2-#8X17/64 CU
57	092079	1	SCREW TAPTITE M6-1.0X25 BP
58	0A1658	2	L/WASH SPECIAL ¼
59	0C2937	1	BRACKET, BATTERY HOLD DOWN (7KW)
60	086729	1	CONTACTOR, STARTER (7KW)
61	0388040AJ0	1	CABLE, #6 RED BATTERY 38.5"
62	022127	2	NUT HEX 1/4-20 STEEL (7KW)
63	022129	6	WASHER LOCK 5/16
	022129	7	WASHER LOCK 5/16 (7KW)
64	074908	8	SCREW TAPTITE M5-0.8 X 10 BP
65	0D2346	1	HARNESS, ENGINE
	0D2345	1	HARNESS, ENGINE (7KW)
66	023484F	1	BUSHING, SNAP SB-1000-12
67	022142	1	SCREW HHC 5/16-18 X 3/4 G5 (7KW)
68	0A7836	2	RIVET,1/8" X 0.126" - 0.375" LSH POP
69	0A8475	2	L/WASH SPECIAL #10
70	0912970069	1	ASSEMBLY, ROOF / DOOR GROUND WIRE
71	0912970070	2	ASSEMBLY, ROOF / DOOR GROUND WIRE
72	055450	2	PLUG PLASTIC 1.375
73	0E5968	11	GASKET, EXTRUDED TRIM
74	0D3701	1	PLATE, "HOT"
75	0D3472	1	GROMMET 2.75 X 1/16
76	0C8742	1	EXTERNAL CONNECTION BOX
77	0C8911	1	POWER BLOCK
78	0D8442	1	HARNESS GENERATOR TO EXT CONN BOX
	0D8652	1	HARNESS GENERATOR TO EXT CONNECTION BOX (7KW)
79	036937	2	SCREW PPHM #10-32 X 1
80	022152	5	WASHER LOCK #10
81	051713	2	WASHER FLAT M5
82	022158	5	NUT HEX #10-32 STEEL
83	0D3031	1	FUEL LINE, 3/4"OUTDOOR (NOT SHOWN)
84	026850	1	WASHER SHAKPROOF EXT 1/4 STEEL
85	049813	1	NUT HEX M6-1.0 G8 YELLOW CHROME
86	0F0164A	1	HINGE TYPE A WITH STUDS, SOCKET
87	0F0165A	1	HINGE TYPE B WITH STUDS, SOCKET
89	0E2874	1	SCREW HHTR 1/4-20 X 3/4
90	043107	4	SCREW HHC M8-1.25 X 25
91	022145	10	WASHER FLAT 5/16
92	045771	4	NUT HEX M8-1.25
93	0C3906	2	SELF-ALIGN SCREW M6 HH
94	0E4321	1	PANEL, EXHAUST ALIGNMENT
95	0E1330A	1	GROMMET, 38.1 CROSS SLIT WITH HOLE
96	0E9692	1	BRACKET, REGULATOR MOUNTING
97	042907	2	SCREW HHC M8-1.25 X 16mm
98	0F5241	1	PLATE, COVER
99	0F5943	1	GASKET, COVER

15 kW Generator
Control Panel – Drawing No. 0E9162-J

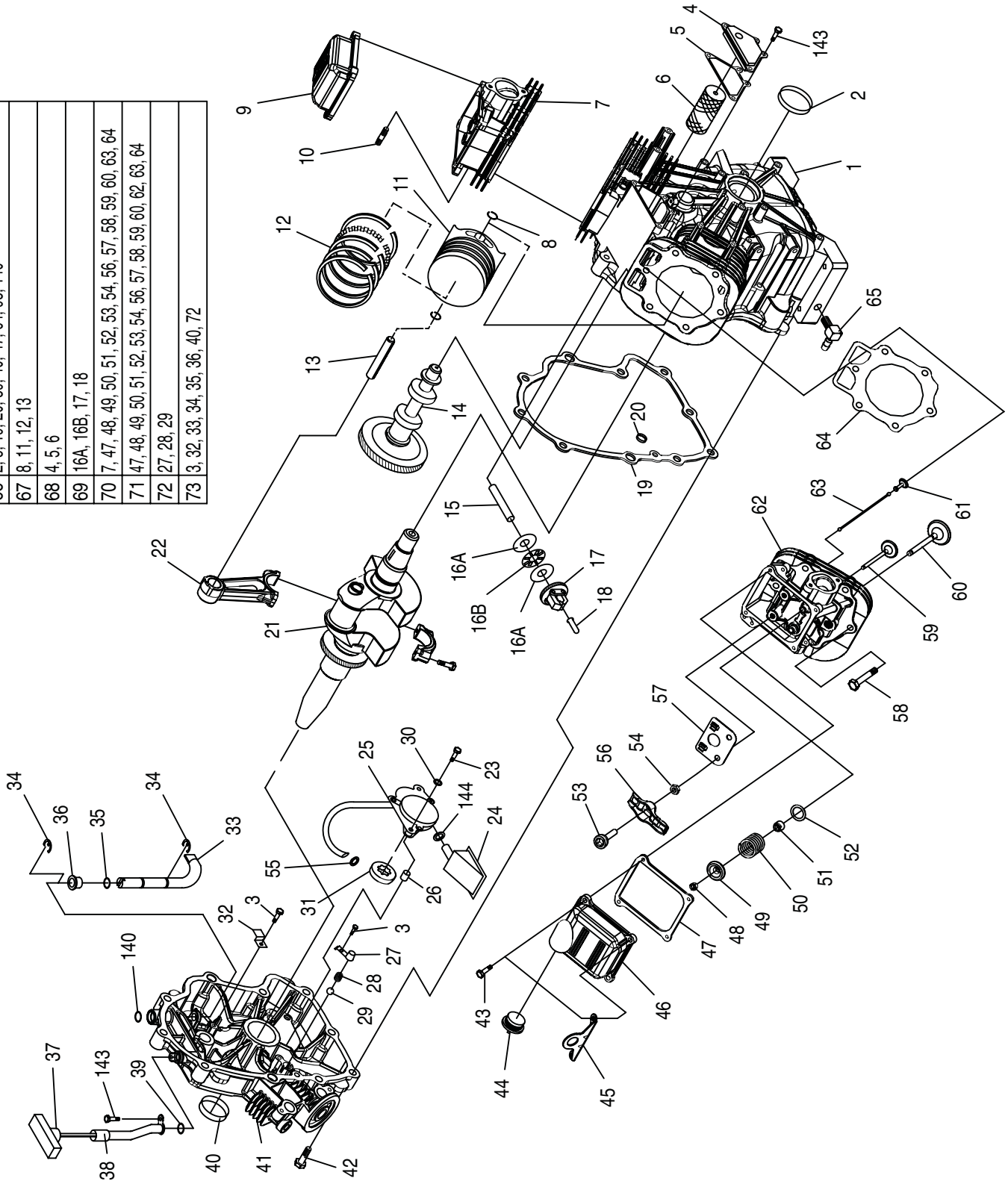


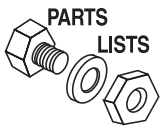


ITEM	PART NO.	QTY.	DESCRIPTION
1	0E7886A	1	CIRCUIT BREAKER 30A X 2P 240V (7KW)
	0E7886E	1	CIRCUIT BREAKER 50A X 2P 240V (12KW)
	0E7886J	1	CIRCUIT BREAKER 65A X 2P 240V (13/15KW)
2	0A1801	1	ASSEMBLY, BATTERY CHARGER ENGINE
3	083049	1	ASSEMBLY, POTTED REGULATOR
4	0C2174	1	RELAY, 12V 25A SPST
5	075210A	1	BLOCK 1 POSITION
6	0D3062	4	HEX STAND-OFF #6-32 x 3/8"
7	0D8615	1	ASSEMBLY, HOME STANDBY CONTROLLER
	0D8615A	1	ASSEMBLY, HOME STANDBY CONTROLLER (7KW)
8	032300	2	HOLDER, FUSE
9	022676	1	FUSE, 15AMP X AGC15
10	0E4494	1	SWITCH, ROCKER DPDT ON-OFF-ON
11	0E7890	1	CIRCUIT BREAKER MOUNTING BRACKET
12	023484E	1	SNAP BUSHING
13	075476	4	SCREW PPHM M4-0.7 x 16mm
15	0E6480	6	NUT HEX LOCK M4-0.7 NYLON INSERT
17	0C1085	6	SCREW PPHM M3-0.5 x 8mm
	0C1085	4	SCREW PPHM M3-0.5 x 8mm (7KW)
19	054502	1	CIRCUIT BREAKER 3 X 1 ETA 46-500-P
	053623	1	CIRCUIT BREAKER 2.5 X 1 ETA 46-500-P (7KW)
20	0E7870	1	CONTROL, PANEL BOTTOM
	0E7871	1	CONTROL, PANEL BOTTOM (7KW)
21	075235	4	SCREW HHC M5-0.8 x 30mm
22	0D5240	1	SWITCH, SPST (ON)-ON N/O
23	0D9784	6	NUT HEX LOCK M3-0.5 NYLON INSERT
	0D9784	4	NUT HEX LOCK M3-0.5 NYLON INSERT (7KW)
24	0D8502	1	NEUTRAL CONNECTOR
26	0E8956	1	HARNESS, CONTROL PANEL (NOT SHOWN)
	0E8957	1	HARNESS, CONTROL PANEL WIRE (NOT SHOWN) (7KW)
27	074908	4	SCREW TAPTITE, M5-0.8 x 10 BP
28	049226	6	WASHER LOCK M5
29	082025	6	NUT HEX LOCK M5-0.8 NYLON INSERT
30	0C3910	1	TRANSFORMER
31	022507	2	SCREW HHC 1/4"-20 x 1/2"
32	0A9611	1	FUSE 7.55A X AGC5
33	046689	1	BLOCK TERMINAL STRIP 20A 4 X 6 X 1100V
34	063617	1	RELAY PANEL 12VDC DPDT 10A 240VAC
35	075475	2	SCREW PPHM M4-0.7 x 10mm
36	043180	2	WASHER FLAT M4
37	0E8812	1	COVER, CONTROL PANEL COMPONENT
	0E8895	1	COVER, CONTROL PANEL COMPONENT (7KW)
38	092036	8	SCREW PPHMS/LW #6-32 x 1/4"
39	045770	2	SCREW HHC M5-0.8 x10mm
40	0E7866	1	COVER, CONTROL PANEL
	0E7867	1	COVER, CONTROL PANEL (7KW)
41	0D3700	8	NUT FLANGE M6-1.0 NYLOK
42	0912970069	1	ASSEMBLY, ROOF/DOOR GROUND WIRE
43	0E2874	1	SCREW HHTR 1/4"-20 X 3/4"
44	0A1658	2	WASHER LOCK SPECIAL 1/4"
45	022473	3	WASHER FLAT 1/4"-M6
46	038750	1	SCREW HHC M6-1.0 x 30mm
47	022097	3	WASHER LOCK M6-1/4"
48	049813	1	NUT HEX M6-1.0
49	031879	6	WASHER FLAT #4
	031879	4	WASHER FLAT #4 (7KW)
50	023897	2	WASHER FLAT #10
51	0E9056	1	SOCKET, 12VDC ACCESSORY
52	0E5840	1	CIRCUIT BREAKER 15A PUSH / PULL MAIN RESET
53	036903	6	SCREW PPHM #6-32 X 5/8"
54	0E7833	1	PLATE, WEATHERPROOF GFCI
55	0E4261	1	OUTLET, 15A GFCI DUPLEX
56	022985	4	WASHER FLAT #6
57	082625	4	NUT LOCK HEX #6-32 NYL INSERT
58	0E9171	1	GASKET, WEATHERPROOF GFCI
59	0F4793	2	SCREW PPHM M3-0.5 x 10mm

15 kW Generator
GT-990 Engine – Drawing No. 0F4715-B Part 1

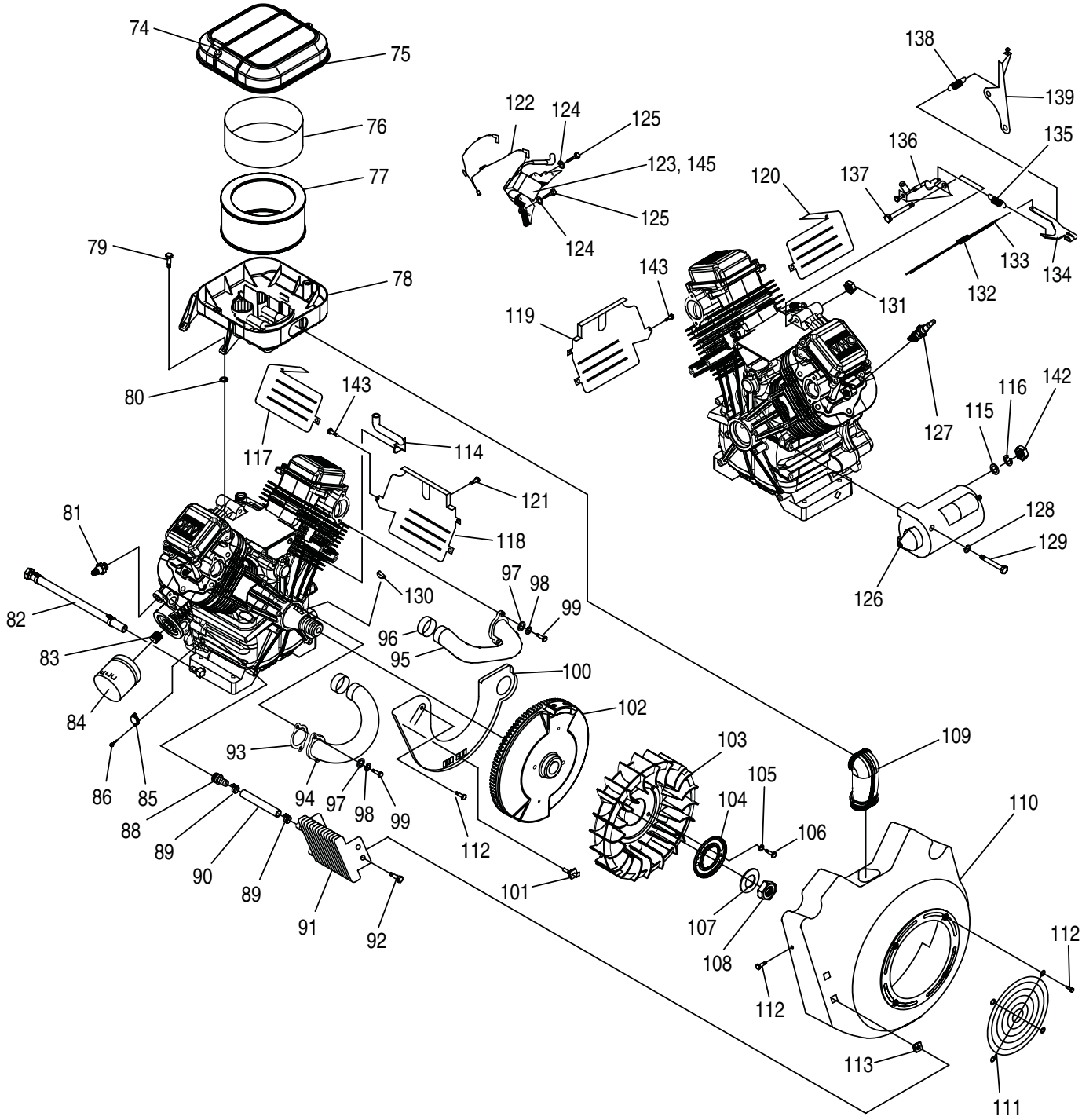
66	2, 5, 19, 20, 39, 40, 47, 64, 93, 140
67	8, 11, 12, 13
68	4, 5, 6
69	16A, 16B, 17, 18
70	7, 47, 48, 49, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 63, 64
71	47, 48, 49, 50, 51, 52, 53, 54, 56, 57, 58, 59, 60, 62, 63, 64
72	27, 28, 29
73	3, 32, 33, 34, 35, 36, 40, 72

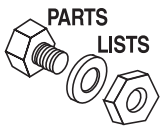




ITEM	PART NO.	QTY.	DESCRIPTION
1	0C5729	1	ASSEMBLY, CRANKCASE HOUSING WITH SLEEVE
2	0E9843	1	SEAL, 38 I.D. CRANKSHAFT
3	090388	3	SCREW, TAPTITE M6-1.0 X 12 YC
4	0C5372	1	ASSEMBLY, BREATHER
5	0C3005	1	GASKET, BREATHER COVER
6	0E3372B	3	SEPARATOR, OIL BREATHER
7	0D8067A	1	ASSEMBLY, HEAD #1 G&S
8	071983	4	RETAINER, PISTON PIN 20
9	0C2981C	1	ROCKER, COVER NO OIL FILL
10	045761A	4	STUD M8-1.25/10MM X 30 G5 ZINC
11	0E2985	2	PISTON, HC
12	021533	2	SET, PISTON RING 90MM
13	0E1466	2	PIN PISTON
14	0D4041	1	ASSEMBLY, CAMSHAFT & GEAR
15	0C2983	1	SHAFT, GOVERNOR
16A	0C2985A	2	ROLLER BEARING, GOVERNOR PLATE
16B	0C2985B	1	ROLLER BEARING, GOVERNOR
17	0D4042	1	ASSEMBLY,GOVERNOR GEAR
18	0A7811	1	SPOOL, GOVERNOR MACHINED
19	0C2977	1	GASKET, CRANK CASE
20	0C5943	1	SEAL, OIL PASSAGE
21	0E4357E	1	ASSEMBLY, CRANKSHAFT HORIZONTAL DIRECT DRIVE
22	0E3223	2	ASSEMBLY, CONNECTING ROD
23	0D2157	2	SCREW SHC M6-1.0 X 50 G8.8
24	0E6098	1	SCREEN, OIL PICKUP
25	0D4123A	1	ASSEMBLY, OIL PUMP
26	078699E	2	SLEEVE, SEAMED DOWEL 10 DIA.
27	0C3011	2	COVER, OIL RELIEF
28	0C3009	2	SPRING, OIL RELIEF
29	0C3010	2	BALL, 1/2D OIL RELIEF
30	093873	2	WASHER, LOCK RIB M6
31	0C5315	1	GEROTOR, OUTER
32	0C5998	1	CLAMP, OIL TUBE
33	0D1667	1	ARM, GOVERNOR
34	0C2991	2	E-RING, GOVERNOR ARM
35	0C2988	1	THRUST WASHER, GOVERNOR
36	0C2992	1	BUSHING, GOVERNOR LOWER
37	0C3971C	1	ASSEMBLY, DIPSTICK WITH HANDLE
38	0C5305	1	TUBE, DIPSTICK
39	0C3027	1	O-RING, OIL CLR 3/8 X 1/2
40	0E9842	1	SEAL, 42 I.D. CRANKSHAFT
41	0C5731	1	ASSEMBLY, HOUSING COVER WITH SLEEVE
42	0C3006	9	SCREW, HHFC M10-1.5 X 55
43	080318	8	SCREW HHFC M6-1.0 X 25
44	093064	1	ASSEMBLY, OIL FILL CAP
45	0C8808	2	HOOK, LIFTING
46	0D2723B	1	ROCKER, COVER WITH OIL FILL
47	0C2979	2	GASKET, VALVE COVER
48	086515	8	KEEPER, VALVE SPRING
49	0D2274	4	RETAINER, VALVE SPRING
50	0D3867	4	SPRING, VALVE
51	078672	2	SEAL, VALVE STEM D7
52	0C5371	4	WASHER, VALVE SPRING
53	072694	4	STUD, ROCKER ARM PIVOT
54	0D3998	4	NUT HEX M8-1.0 G8 YEL CHR
55	0C3027	2	O-RING, 3/8" X 1/2"
56	0D5313	4	ROCKER ARM
57	0D6024	2	PLATE, PUSH ROD GUIDE
58	0C2976	12	SCREW HHFC M8-1.25 X 65
59	086516	2	VALVE, EXHAUST
60	0C2229	2	VALVE, INTAKE
61	083897	4	TAPPET, SOLID
62	0D8067B	1	ASSEMBLY, HEAD #2 G&S
63	0D9853D	4	PUSHROD, 147
64	0C2978	2	GASKET, HEAD
65	043790	1	BARBED ELBOW 90 3/8NPT X 3/8
66	0D4010	1	KIT GASKET
67	0D4011	1	KIT PISTON & RINGS
68	0D4012	1	KIT BREATHER ASSEMBLY
69	0D4013	1	KIT GOVERNOR ASSEMBLY
70	0D8675A	1	KIT HEAD ASSEMBLY CYLINDER 1
71	0D8675B	1	KIT HEAD ASSEMBLY CYLINDER 2
72	0D4015	1	KIT OIL RELIEF
73	0D4016	1	KIT GEAR COVER

15 kW Generator
GT-990 Engine – Drawing No. 0F4715-B Part 2

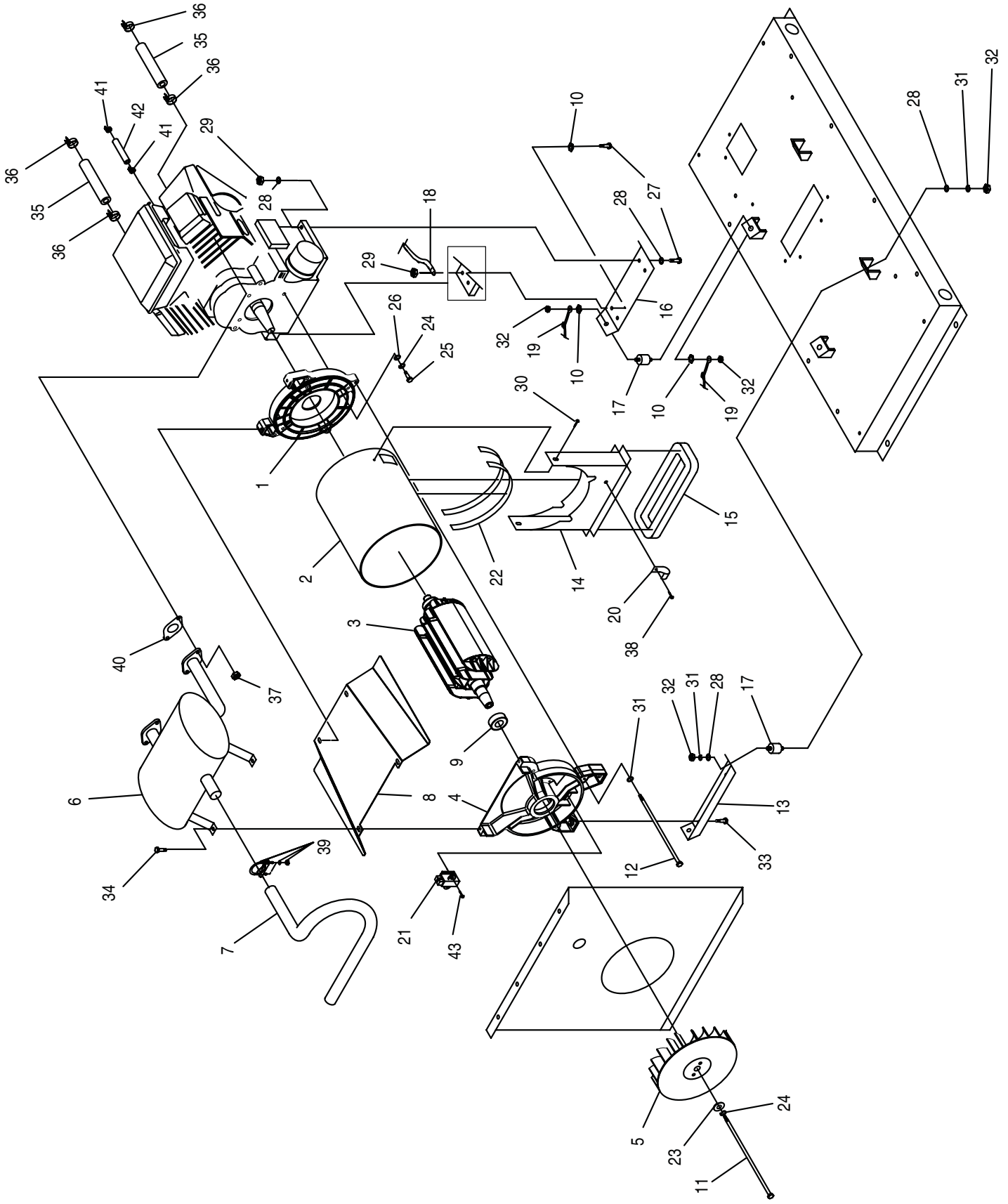


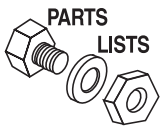


ITEM	PART NO.	QTY.	DESCRIPTION
74	0C5136A	2	KNOB, AIR CLEANER
75	0C3024	1	COVER, AIRBOX NG/LP
76	0C3040	1	PRE-CLEANER,
77	0C8127	1	ELEMENT, AIR CLEANER
78	0D8564A	1	ASSEMBLY, MIXER/AIRBOX 990
	0D8564B	1	ASSEMBLY, MIXER/AIRBOX 760
79	0D2595	4	SCREW SHOULDER (8MM) M6-1.0 X 18
80	0D4417	4	WASHER,RUBBER 1/4" X 1/8" THICK
81	0C3025	1	SWITCH, OIL PRESS
82	0D3083	1	ASSEMBLY, OIL DRAIN HOSE
83	0C7292	1	NIPPLE, 3/4"-16 UNF
84	070185D	1	OIL FILTER
85	075281	1	SWITCH, THERMAL 284F
86	0F2094	2	SCREW, M3-0.5 X 6 SEMS
87	0F1338A	1	ASSY, IGN COIL W/DIODE NO ADV
88	035461	2	BARBED STR 1/4NPT X 3/8
89	0F6301	4	CLAMP, HOSE OETIKER 16.5mm
90	0C9806	2	HOSE, 3/8" I.D. X 6" LONG
91	0C3026	1	COOLER, OIL
92	0C9764	4	PLASTITE,1/4-15 X 3/4
93	0C3043	2	GASKET, MANIFOLD / PORT
94	0C7694	1	MANIFOLD CYLINDER 2
95	0C7693	1	MANIFOLD CYLINDER 1
96	0C3041A	2	SLEEVE, RUBBER
97	070008	4	WASHER FLAT M8 SS
98	070006	4	WASHER LOCK M8 SSTL
99	040976	4	SCREW SHC M8-1.25 X 20 G12.9
100	0F1170A	1	PLATE, BACKING WITH OIL COOLER
101	0E4997	1	GROUND WIRE CONNECTOR
102	0C3725B	1	FLYWHEEL ASSEMBLY
103	0C3031	1	FAN, NYLON
104	0C3032	1	PLATE, FAN
105	0A5992	2	WASHER SHAKEPROOF INT M8 SS
106	051754	2	SCREW HHC M8-1.25 X 12 G8.8
107	0C3033	1	WASHER, 25mm I.D.
108	0C3034	1	NUT,HEX M24
109	0C8549A	1	SNORKEL, AIR INTAKE
110	0F1169A	1	HOUSING, BLOWER NG COOLER
111	0D1131	1	GUARD, FAN
112	045756	25	SCREW TAPTITE M6-1X10 YELLOW CHROME
113	0C9763	4	NUT, GROMMET 1/4 PLUG
114	0C3036A	1	HOSE, BREATHER
115	022145	1	WASHER FLAT 5/16-M8 ZINC
116	022129	1	WASHER LOCK M8-5/16
117	0C3018	1	WRAPPER, UPPER CYLINDER 1
118	0C3019	1	WRAPPER, LOWER CYLINDER 1
119	0D1142A	1	WRAPPER, LOWER CYLINDER 2
120	0D1143	1	WRAPPER, UPPER CYLINDER 2
121	0E6043	2	SCREW TAPTITE M5-0.8 X 8 ZP
122	0F1177	1	ASSEMBLY, GROUND WIRE
123	0F1338B	1	ASSY, IGN COIL W/DIODE NO ADV
124	022097	4	WASHER LOCK M6-1/4
125	092079	4	SCREW TAPTITE M6-1.0 X 25 BP
126	0E4271	1	STARTER
127	0D4529	2	SPARKPLUG
128	022129	2	WASHER LOCK M8-5/16
129	061906	2	SCREW HHC M8-1.25 X 85 G8.8
130	082774	1	KEY, WOODRFF 4 X 19D
131	0E5343	1	NUT HEX LOCK M10-1.50
132	0C8468	1	SPRING, ANTI-LASH
133	0C3048	1	ROD, GOVERNOR CONTROL
134	0D3754	1	ASSEMBLY, GOVERNOR LEVER
135	0D3742	1	SPRING, GOVERNOR
136	0C8482	1	ASSEMBLY, GOVERNOR ADJUSTER
137	0E0486	1	SCREW SHC M10-1.5 X 75 G10.9
138	0D3743	1	SPRING, GOVERNOR IDLE
139	0D3705	1	ASSEMBLY, GOVERNOR ADJUSTER BRACKET
140	0C2993	1	SEAL, GOVERNOR SHAFT
142	045771	1	NUT HEX M8-1.25 G8
143	0D6147	7	SCREW HHFC M6-1.0 X 10mm
144	0E8152	1	O-RING 0.49" I.D. X 0.07" THICK

15 kW Generator

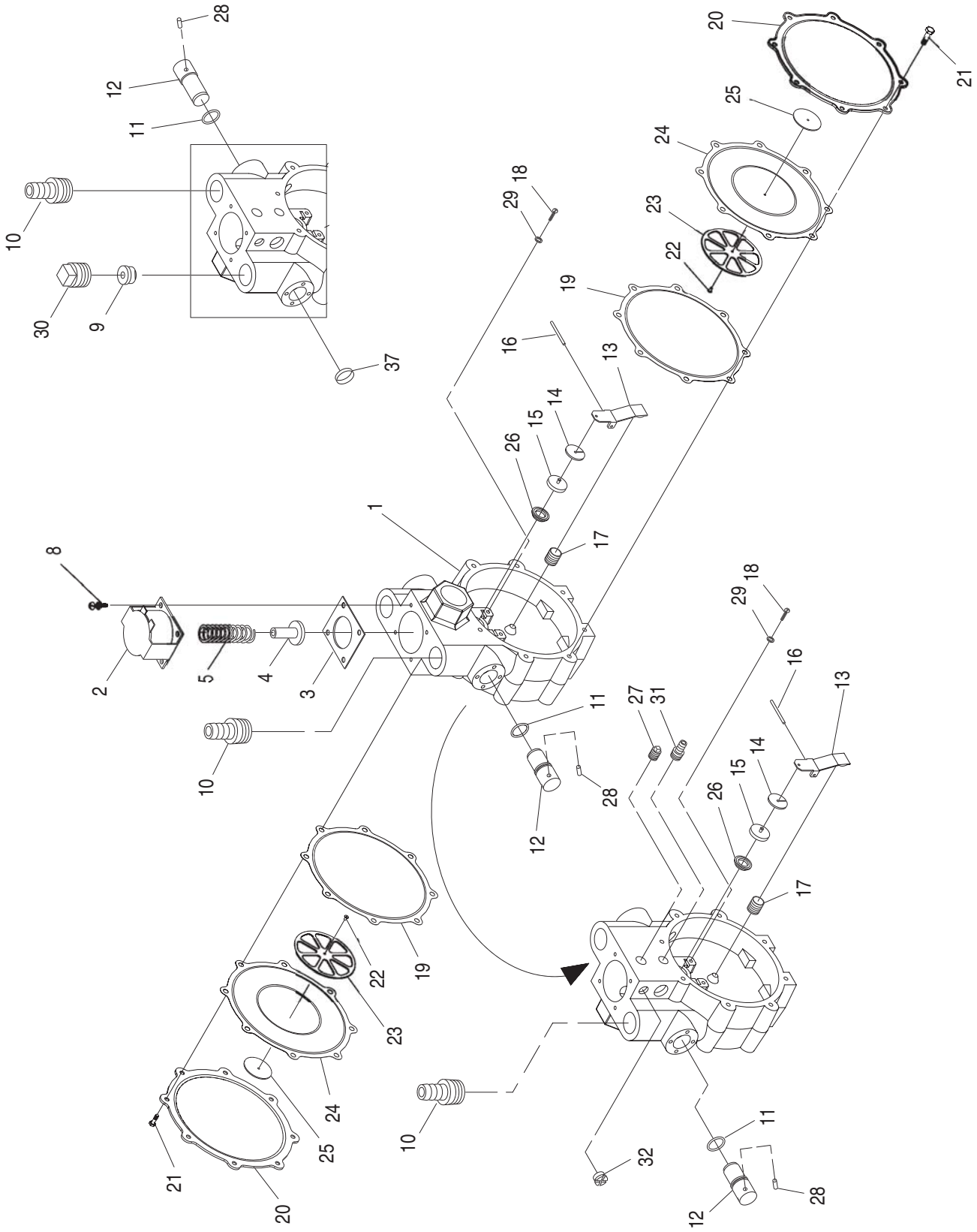
15 kW Generator – Drawing No. 0D3417-L

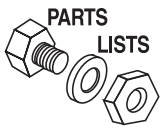




ITEM	PART NO.	QTY.	DESCRIPTION
1	0C6934	1	ADAPTOR, ENGINE
2	0C7930	1	STATOR 12KW
	0D2359		STATOR 13KW / 15KW
3	0C7944	1	ROTOR 12KW
	0D2356		ROTOR 13KW / 15KW
4	0C6043	1	CARRIER, REAR BEARING
5	0D2336	1	FAN, 12" CURVED BLADE
6	0D6634	1	MUFFLER
7	0D3220	1	TAIL PIPE, MUFFLER
8	0C8101	1	PANEL, MUFFLER BASE
9	056482	1	BEARING 1.1811-2.8346
10	0C3168	3	5/16 SPECIAL LOCK WASHER
11	0D1838	1	BOLT, HHCS 3/8"-24 x 15.50"
12	0D1846	4	BOLT, HHCS M8-1.25 x 345mm
13	0C7038	1	BRACKET, ALTERNATOR MOUNTING
14	0D1609	1	DUCT, ALTERNATOR AIR
15	0D2559	1	GASKET, ALTERNATOR AIR DUCT
16	0C7038A	1	BRACKET, ENGINE MOUNTING
17	0C7758	4	RUBBER MOUNT
18	0388050AD0	1	CABLE, #6 48" BLACK BATTERY
19	0C2417A	1	EARTH STRAP 3/8X 3/8
20	082121C	1	CLIP-J, VYNL COAT 0.625" ID
21	066386	1	ASSEMBLY BRUSH HOLDER
22	029451	2.6 FT	TAPE ELEC UL FOAM 1/8 X 1/2
23	049451	1	WASHER FLAT .406ID X 1.62OD
24	022237	5	WASHER LOCK 3/8
25	022511	4	SCREW HHC 3/8-16 X 1-1/4 G5
26	022131	4	WASHER FLAT 3/8 ZINC
27	051731	4	SCREW HHC M8-1.25 X 50 G8.8
28	022145	12	WASHER FLAT 5/16 ZINC
29	049820	4	NUT LOCK HEX M8-1.25 NYL INSERT
30	045756	2	SCREW TAPTITE M6-1.0X10 BP
31	022129	10	WASHER LOCK M8-5/16
32	022259	8	NUT HEX 5/16-18 STEEL
33	059637	2	SCREW TAPTITE 3/8-16 X 3/4 BP
34	0D4662	4	SCREW 5/16-18X3/4" HH THD ROLL
35	0F7065	3 FT	HOSE RES 1/2 LP GAS
36	048031M	4	HOSE CLAMP 3/4" I.D.
37	0F0462	4	NUT HEX W/TOOTH WSHR M8-1.25
38	0C2824	1	SCREW TAP-R #10-32 x 9/16
39	025145	1	U-BOLT 5/16"-18 X 1.25" WITH SADDLE
40	0C4138	2	GASKET, EXHAUST PORT
41	040173	2	CLAMP HOSE #5.5 0.62"-0.62"
42	074995	1.44 FT	HOSE 1\4 ID LPG 350PSI UL21
43	066849	2	SCREW HHTT M5-0.8 X 16

15 kW Generator
Gas Regulator – Drawing No. 0D8720-G





ITEM	PART NO.	QTY.	DESCRIPTION
1	0D5694	1	CASTING, TWIN REGULATOR HOUSING
2	0F5022	1	SOLENOID COIL, 12VDC
3	0C4647	1	GASKET , SOLENOID
4	0D4166	1	PLUNGER, LP REGULATOR ASSEMBLY
5	0C6070	1	SPRING-SOLENOID, PLUNGER
8	0F4795	4	SCREW PPHM SEMS M4-0.7 X 10
9	0C5760J	1	JET, GN 410 ENGINE LP (7KW)
10	0C6606	2*	BARBED STRAIGHT 1/2NPT x 1/2
11	097934	2*	O-RING, CHECK VALVE
12	0C4645	2*	ADJUSTER SCREW, TWIN REGULATOR
13	0C5761	2	LEVER, REGULATOR
14	0C5968	2	SUPPORT, INLET SEAL
15	0C6066	2	SEAL, INLET
16	0C5759	2	PIN, PIVOT ARM
17	0C5764	2	SPRING, REGULATOR
	0C5764A	2	SPRING, REGULATOR (7KW)
18	070728	4	SCREW, PFHMS M3-0.5 x 5
19	0C6069	2	GASKET, DIAPHRAGM
20	0C5762	2	COVER, TWIN REGULATOR
21	045764	16	SCREW, TAPTITE M4X8 BP
22	0C6731	2	RIVET, POP .118 X .125
23	0C6067	2	SUPPORT, DIAPHRAGM
24	0C4706	2	DIAPHRAGM, TWIN REGULATOR
25	0C6068	2	CAP, DIAPHRAGM SUPPORT
26	0C4643A	2	INLET, TWIN REGULATOR 11.11 DIA.
27	026073	1	PLUG, STANDARD PIPE 1/8" STEEL SQUARE HEAD
	026073	2	PLUG, STANDARD PIPE 1/8" STEEL SQUARE HEAD (7KW)
28	0A4032	2*	PIN, LIMITED ADJUSTMENT
29	0D3308	4	WASHER, FLAT M3 X 10mm O.D.
30	024310	1	PLUG, STANDARD PIPE 1/2" STEEL SQUARE HEAD (7KW)
31	028414A	1	BARBED STRAIGHT 1/8"NPT X 1/4"
32	0D5698A	1	JET IDLE PRIMER PHILLIPS HD (V-TWIN ONLY)
37	0D3973	1	PLUG, EXPANSION 16mm

* A QUANTITY OF 1 IS TO BE USED ON 7KW HOME STANDBY

NOTE: This Emission Control Warranty Statement pertains to this product only IF the generator size is 15 kW or below.

CALIFORNIA AND FEDERAL EMISSION CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (CARB) and the United States Environmental Protection Agency (EPA), together with Generac Power Systems, Inc. (Generac), are pleased to explain the Emission Control System Warranty on your new engine.* New (small off road) engines must be designed, built and equipped to meet stringent anti-smog standards for the state of California and the federal government. Generac will warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect, unapproved modification or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor, ignition and exhaust systems. Generac will repair your engine at no cost to you for diagnosis, replacement parts and labor, should a warrantable condition occur.

MANUFACTURER'S EMISSION CONTROL SYSTEM WARRANTY COVERAGE:

Emissions control systems on engines are warranted for two years as hereinafter noted. If, during such warranty period, any emission-related component or system on your engine is found to be defective in materials or workmanship, repairs or replacement will be performed by a Generac Authorized Warranty Service Facility.

PURCHASER'S/OWNER'S WARRANTY RESPONSIBILITIES:

As the engine purchaser/owner, you are responsible for the completion of all required maintenance as listed in your factory supplied *Owner's Manual.* For warranty purposes, Generac recommends that you retain all receipts covering maintenance on your engine. However, Generac cannot deny warranty solely because of the lack of receipts or for your failure to ensure the completion of all scheduled maintenance.

As the engine purchaser/owner, you should, however, be aware that Generac may deny any and/or all warranty coverage or responsibility if your engine, or a part/component thereof, has failed due to abuse, neglect, improper maintenance or unapproved modifications, or the use of counterfeit and/or "grey market" parts not made, supplied or approved by Generac.

You are responsible for presenting your engine to a Generac Authorized Warranty Service Facility as soon as a problem occurs. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

Warranty service can be arranged by contacting either your selling dealer or a Generac Authorized Warranty Service Facility. To locate the Generac Authorized Warranty Service Facility nearest you, call our toll-free number:

1-800-333-1322

IMPORTANT NOTE: This warranty statement explains your rights and obligations under the Emission Control System Warranty (ECS Warranty), which is provided to you by Generac pursuant to California and federal law. See also the "Generac Limited Warranties for Generac Power Systems, Inc.," which is enclosed herewith on a separate sheet, also provided to you by Generac. The ECS Warranty applies **only** to the emission control system of your new engine. If there is any conflict in terms between the ECS Warranty and the Generac Warranty, the ECS Warranty shall apply except in circumstances where the Generac Warranty may provide a longer warranty period. Both the ECS Warranty and the Generac Warranty describe important rights and obligations with respect to your new engine.

Warranty service can be performed only by a Generac Authorized Warranty Service Facility. When requesting warranty service, evidence must be presented showing the date of the sale to the original purchaser/owner. The purchaser/owner shall be responsible for any expenses or other charges incurred for service calls and/or transportation of the product to/from the inspection or repair facilities. The purchaser/owner also shall be responsible for any and/or all damages or losses incurred while the engine is being transported/shipped for inspection or warranty repairs.

If you have any questions regarding your warranty rights and responsibilities, you should contact Generac at the following address:

ATTENTION WARRANTY DEPARTMENT
GENERAC POWER SYSTEMS, INC.
P.O. BOX 297
WHITEWATER, WI 53190

Part 1

EMISSION CONTROL SYSTEM WARRANTY

Emission Control System Warranty (ECS Warranty) for 1997 and later model year engines:

(a) Applicability: This warranty shall apply to 1997 and later model year engines. The ECS Warranty Period shall begin on the date the new engine or equipment is purchased by/delivered to its original, end-use purchaser/owner and shall continue for 24 consecutive months thereafter.

(b) General Emissions Warranty Coverage: Generac warrants to the original, end-use purchaser/owner of the new engine or equipment, and to each subsequent purchaser/owner, that each of its engines is ...

(1) Designed, built and equipped so as to conform with all applicable regulations adopted by the EPA and CARB pursuant to their respective authority, and

(2) Free from defects in materials and workmanship which, at any time during the ECS Warranty Period, may cause a warranted emissions-related part to fail to be identical in all material respects to the part as described in the engine manufacturer's application for certification.

(c) The ECS Warranty only pertains to emissions-related parts on your engine, as follows:

(1) Any warranted, emissions-related parts that are not scheduled for replacement as required maintenance in the *Owner's Manual* shall be warranted for the ECS Warranty Period. If any such part fails during the ECS Warranty Period, it shall be repaired or replaced by Generac according to Subsection (4) below. Any such part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period.

(2) Any warranted, emissions-related part that is scheduled only for regular inspection as specified in the *Owner's Manual* shall be warranted for the ECS Warranty Period. A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the ECS Warranty Period. Any such part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period.

(3) Any warranted, emissions-related part that is scheduled for replacement as required maintenance in the *Owner's Manual* shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by Generac according to Subsection (4) below. Any such emissions-related part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period prior to the first scheduled replacement point for such emissions-related part.

(4) Repair or replacement of any warranted, emissions-related part under this ECS Warranty shall be performed at no charge to the owner at a Generac Authorized Warranty Service Facility.

(5) When the engine is inspected by a Generac Authorized Warranty Service Facility, the owner shall not be held responsible for diagnostic costs if the repair is deemed warrantable.

(6) Generac shall be liable for damages to other original engine components or approved modifications proximately caused by a failure under warranty of any emission-related part covered by the ECS Warranty.

(7) Throughout the ECS Warranty Period, Generac shall maintain a supply of warranted emission-related parts sufficient to meet the expected demand for such emission-related parts.

(8) Any Generac authorized and approved emission-related replacement part may be used in the performance of any ECS Warranty maintenance or repairs and will be provided without charge to the purchaser/owner. Such use shall not reduce Generac's ECS Warranty obligations.

(9) Unapproved, add-on, modified, counterfeit and/or "grey market" parts may not be used to modify or repair a Generac engine. Such use voids this ECS Warranty and shall be sufficient grounds for disallowing an ECS Warranty claim. Generac shall not be held liable hereunder for failures of any warranted parts of a Generac engine caused by the use of such an unapproved, add-on, modified, counterfeit and/or "grey market" part.

EMISSION RELATED PARTS INCLUDE THE FOLLOWING:

1) Fuel Metering System:

1.1) Gasoline carburetor assembly and its internal components (if so equipped).
- a) Fuel filter (if so equipped)
- b) Carburetor gaskets
- c) Fuel pump (if so equipped)

1.2) LPG carburetion assembly and its internal components (if so equipped).
- a) Fuel controller (if so equipped)
- b) Mixer and its gaskets (if so equipped)
- c) Carburetor and its gaskets (if so equipped)
- d) Primary gas regulator (if so equipped)
- e) LP liquid vaporizer (if so equipped)

2) Air Induction System including:
- a) Intake pipe/manifold
- b) Air cleaner

3) Ignition System including:
- a) Spark plug
- b) Ignition module

4) Catalytic Muffler Assembly (if so equipped) including:
- a) Muffler gasket
- b) Exhaust manifold

5) Crankcase Breather Assembly including:
- a) Breather connection tube

*Generac engine types covered by this warranty statement include the following:

1) Utility
2) Lawn and Garden Equipment
3) Recreational Vehicle (RV) Generator
4) Industrial Mobile (IM) Generator

Part 2

BRYANT "TWO YEAR" LIMITED WARRANTY FOR "PREPACKAGED EMERGENCY AUTOMATIC STANDBY GENERATORS"

For a period of two years from the date of original sale, warrants that its generator will be free from defects in material and workmanship for the items and period set forth below. Bryant will, at its option, repair or replace any part which, upon examination, inspection and testing by a Bryant Dealer, is found to be defective. All transportation costs under the warranty, including return to the factory, are to be borne and prepaid by the purchaser/owner. This warranty applies only to Bryant prepackaged emergency automatic standby generators sold and rated for use in "Standby" applications.

WARRANTY SCHEDULE

YEARS ONE AND TWO - 100% (one hundred percent) transferable coverage on Labor and Part(s) listed.
ENGINE - All Components
ALTERNATOR - All Components
TRANSFER SYSTEM - All Components

Steel enclosures are warranted against rusting for the first year of ownership only. Damage caused after receipt of generator is the responsibility of the owner and is not covered by this warranty. Nicks, scrapes, dents or scratches to the painted enclosure should be repaired promptly by the owner.

THIS WARRANTY SHALL NOT APPLY TO THE FOLLOWING:

- Bryant generators that utilize non-Bryant replacement parts.
- Bryant generators utilizing non-Bryant automatic transfer switches.
- Any Bryant generators used as rental or trailer mounted applications.
- Air-cooled units used for prime power in place of existing utility power where utility power is present or in place of utility power where utility power service does not normally exist.
- Costs of normal maintenance, adjustments, installation and start-up.
- Steel enclosures that are rusting due to the improper installation, location in a harsh or saltwater environment or scratched where integrity of paint applied is compromised.
- Failures caused by any contaminated fuels, oils, coolants or lack of proper fluid amounts.
- Failures due, but not limited to, accident, misuse, abuse, negligence or improper installation. As with all mechanical devices, the Bryant engines need periodic part(s) service and replacement to perform well.
- Failures caused by any external cause or act of God, such as collision, theft, vandalism, riot or wars, nuclear holocaust, fire, freezing, lightning, earthquake, windstorm, hail, volcanic eruption, water or flood, tornado or hurricane.
- Damage related to rodent and/or insect infestation.
- Products that are modified or altered in a manner not authorized by Bryant in writing.
- Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective part(s).
- Failure due to misapplication.
- Telephone, cellular phone, facsimile, internet access or other communication expenses.
- Living or travel expenses of person(s) performing service, except as specifically included within the terms of a specific unit warranty period.
- Expenses related to "customer instruction" or troubleshooting where no manufacturing defect is found.
- Rental equipment used while warranty repairs are being performed.
- Costs incurred for equipment used for removal and/or reinstallation of generator, (i.e.; cranes, hoists, lifts, etc.)
- Overnight freight costs for replacement part(s).
- Overtime labor.
- Starting batteries, fuses, light bulbs and engine fluids.

THIS WARRANTY IS IN PLACE OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. SPECIFICALLY,

BRYANT MAKES NO OTHER WARRANTIES AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

BRYANT 'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PART(S) AS STATED ABOVE. IN NO EVENT SHALL BRYANT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF BRYANT 'S NEGLIGENCE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you.
This warranty gives you specific legal rights. You also have other rights from state to state.

Revision (10/01/04)